DOCUMENT RESUME

ED 309 228 UD 026 895

AUTHOR Levy, Frank; Michel, Richard C.
TITLE Education and Income: Recent U.S. Trends.
INSTITUTION Urban Inst., Washington, D.C.
PUB DATE Dec 88
NOTE 70p.; Paper prepared for the Joint Economic Committee of the U.S. Congress.
AVAILABLE FROM The Urban Institute, 2100 M Street, NW, Washington, DC 20037.
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Age Differences; Business Cycles; College Graduates; *Economic Factors; Economic Research; Elementary Secondary Education; Females; Higher Education; *Labor Needs; *Labor Supply; Males; *Outcomes of Education; *Wages
IDENTIFIERS *Macroeconomics

ABSTRACT

This paper examines the growing college premium for younger men and the earnings patterns for other groups that developed between 1973 and 1987. At first glance, the rapidly increasing college premium for young men seems to confirm several frequently cited economic trends, including a massive restructuring of the economy that displaces all less educated workers into low-paying jobs and the devaluation of a high school diploma due to the deterioration of public education. However, a review of earning trends for all groups of workers suggests the influence of the following forces on wage trends: (1) shifts in the demand for different kinds of labor; (2) shifts in the supply of different kinds of labor; and (3) macroeconomic forces which determine the underlying trend in wage growth. The economic stagnation of the 1973-1987 period explains the slow growth of all earnings. However, most movements in relative earnings were not driven by changes in the supply of different kinds of labor. The earnings of older men and women performed better than those of younger workers because and demand for younger workers decreased during periods of adjustment in manufacturing employment. Much of the continued slow growth in wages reflects the sustained low growth in productivity which reflects our ability to educate workers. Statistical data are included on six graphs and eight tables. The appendices comprise discussions of the effects of alternative price deflators on real income and testing for the significance of earnings differences. (FMW)

**********
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
**********

5-23-89

ED309228

# EDUCATION AND INCOME: RECENT U.S. TRENDS

by

Frank Levy
and
Richard C. Michel*

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

☒ This document has been reproduced as received from the person or organization originating it.

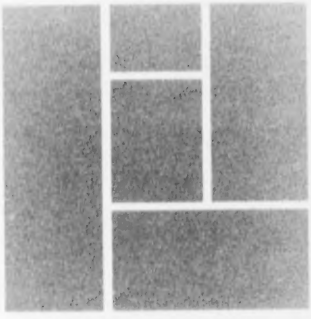
☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Anne Friedman
Urban Institute

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."



THE URBAN INSTITUTE
2100 M Street, N.W.
Washington, D.C. 20037

Project Report

UD 026 895

**Not for Quotation
or Citation Without
Authors' Permission**

# EDUCATION AND INCOME: RECENT U.S. TRENDS

by

Frank Levy
and
Richard C. Michel*

December 1988

* Paper prepared for the Joint Economic Committee of the U.S. Congress. Levy is an economist at the University of Maryland's School of Public Affairs and was a Visiting Fellow at the Brookings Institution when this paper was written. Michel is Director of the Center on Income Security and Pension Policy at The Urban Institute. The authors wish to thank Patrick Purcell for extensive research, programming and editing assistance, Chuck Byce and Chrissy deFontenay for extensive programming assistance, Lorelei Stewart and Caroline Ratcliffe for research assistance, and Katherine Abraham, Martin N. Baily, Jim Klumpner, Dan Melnick, Rob Meyer, Lee Price, and a set of anonymous referees for helpful comments in preparing this work.

TABLE OF CONTENTS


| | | Page |
|---|---|---|
| I. | Introduction | 1 |
| II. | Reviewing the Data: What is to Be Explained? | 11 |
| III. | Setting the Context: Twelve Years of Stagnant Wages | 25 |
| IV. | Changes in Labor Supply | 30 |
| V. | Changes in Labor Demand | 33 |
| VI. | Solving the Middle Class Jobs Riddle | 43 |
| Appendix A: | The Effects of Alternative Price Deflators on Real Income | 57 |
| Appendix B: | Testing for the Significance of Earnings Differences | 62 |

TABLE OF FIGURES AND TABLES


Page

Figures

Figure 1 Median Income of Men, 25-34 Years Old ..... 4

Figure 2 Median Income of Men, 35-44 Years Old ..... 6

Figure 3 Earnings Distribution of Workers ..... 47

Figure 4 Earnings Distribution of Men: 1973, 1987 ..... 49

Figure 5 Earnings Distribution, Women: 1973, 1987 ..... 50

Figure 6 Earnings of Male High School Graduates ..... 55

Tables

Table 1 Changes in Mean Individual Earnings for Men and Women who Work Full-Time, by Age and Educational Level: 1973, 1979, 1987 ..... 13

Table 2 Mean Earnings of All Men and Women with $1 or More of Earnings, 1973 and 1987, and Decomposition of Changes in Earnings into Changes in Wages and Changes in Hours Worked ..... 17

Table 3 Ratio of Wages of Workers with Specified Education to Wages of Workers with 4 Years of College, 1973 and 1987 ..... 23

Table 4 The Stagnation of Workers' Income After 1973 ..... 27

Table 5 Changes in Group's Size and Group's Average Annual Earnings for 25-54 Year Old Men and Women Workers, 1973-1987 ..... 32

Table 6 Distribution of Men and Women Across Industrial Sectors, 1973 ..... 36

Table 7 Mean Earnings by Sector for Men and Women of Selected Education: 1973, 1986 ..... 39

Table 8 Distribution of Employed Men and Women Across Industrial Sectors, by Selected Age and Education, 1973, 1979, and 1987 ..... 41

# I. INTRODUCTION

In 1976, economist Richard B. Freeman published The Overeducated American, an influential book in which he argued that a college education no longer guaranteed a big income gain. In Freeman's description, America had reached a state of over-education where:

> ...the economic rewards to college education are markedly lower than has historically been the case and/or in which additional investment in college training will drive down those rewards - a society in which education has become, like investments in other mature industries or activities a marginal rather than highly profitable endeavor. (pp.4-5).

U.S. Census data supported Freeman's view. Consider the percentage difference in individual income between the average 30 year-old man with four years of high school and the average 30 year-old man with 4 years of college.[1] Using published U.S. Census income, we can approximate this difference using the following ratio:[2]

1) $\dfrac{\text{Median Income of 25-34 year-old men with 4 years of college}}{\text{Median Income of 25-34 year-old men with 4 years of H.S.}}$

---

1. Individual income refers to income from all sources (earnings, interest payments, unemployment compensation, etc.) that accrue to the individual. Income of other family members, if any, is not counted. The median income of a group is the income at the mid-point of the distribution such that half the individuals in the group have more and half have less. While we can call median income "average income", we note below that there are systematic differences between median income and mean income, a second way of measuring an average.

2. In this ratio, we are using the median income of all 25-34 year-old men--the form in which data is published -- to approximate the median income of 30 year-old men. In the ratio, the term "4 years of high school" (or 4 years of college) refers to a person with exactly 4 years of high school (college), not 4 years or more.

Throughout the 1950's the ratio stood at about 1.30, meaning that a 30 year-old man with four years of college had 30% more income than a 30 year-old man with a high school diploma. By the mid-1960's, the rapid growth in the number of college graduates caused the college income premium for men to fall to 25%. And by 1973, - the time Freeman was writing - it had fallen to 15%.

There is evidence that the income premium for college educated women was also declining, at least modestly. Constructing women's income trends from published historical data must be done with care because women's labor force participation was increasing rapidly over this period and increased hours of work can raise median incomes even if hourly wages do not change. We can make a rough adjustment for this problem by calculating the ratio (1) for only those women who work year-round full-time, a sample of women who work at least 1,750 hours per year. Data on year-round full-time workers by educational level first became available in 1967. In that year, the college premium for 30 year old women stood at 39%. By 1969, it had risen slightly to 41%, but by 1973, it too had declined modestly, to 34%.[3]

Freeman explained the declining value of a college diploma through an elegant application of supply and demand for different kinds of labor. During the 1950's and 1960's,

---

3. All data in these paragraphs comes from volumes in the P-60 series of Current Population Reports published by the U.S. Bureau of the Census, in particular, "Money Income in 1973 of Families and Persons in the United States" (Series P-60, no. 97) Table 58, and "Money Income of Households, Families and Persons in the United States: 1985" (Series P-60, no. 156) Table 35. Throughout the paper, inflation adjustments into 1987 dollars are made using the Personal Consumption Expenditure deflator (PCE) of the Gross National Product Accounts. The issue about which deflator to use is a complex one. Most analysts are now using either the PCE or a specialized series of the Consumer Price Index called the CPI-X1, both of which yield about the same figures over the period since 1973.

he argued, changing technology together with the growth of government had created a surge in demand for college educated, white collar workers.[4] Given normal career patterns, most of these new jobs would be filled by young college graduates (rather than older high school graduates who went back to college). Educating young adults took time and so it was several years before the supply of college graduates caught up with demand. But by the late 1960's, Freeman argued, the catch-up had occurred and the college income premium, particularly for young men, declined correspondingly.

The Census numbers (and Freeman's explanation) held up for the rest of the 1970's. Then the ground began to shift, again most clearly under younger men. For 30 year-old men, the income premium for college graduates increased from 15% in 1973 to 30% in 1980 and 37% in 1983. By 1987 (the latest data published), it had expanded to 49%, the highest it had been since at least World War II (Figure 1).

The purpose of this paper is to examine both the growing college premium for younger men and the earnings patterns for other groups of workers that developed between 1973 (and the first OPEC oil price shock) and 1987.

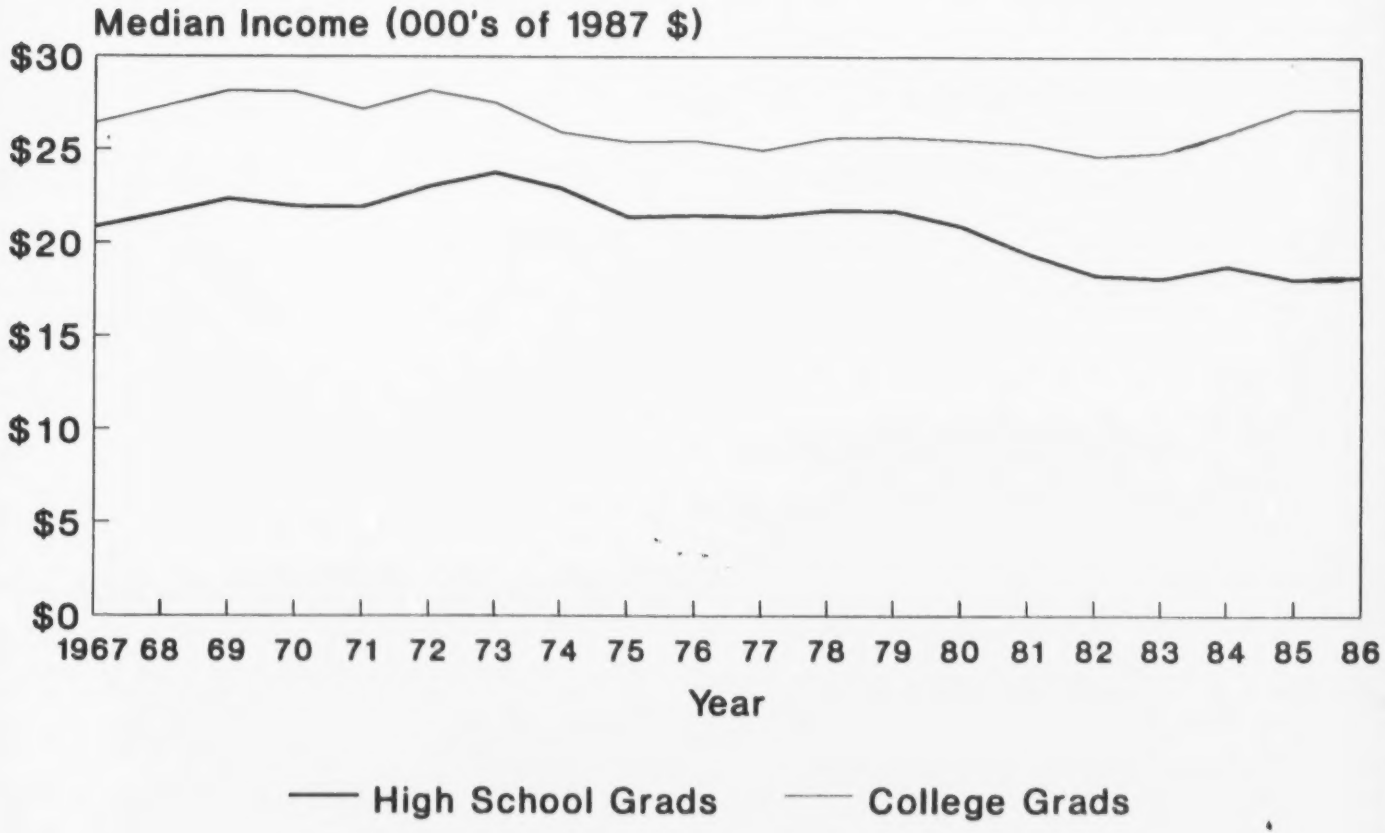
At first glance, the rapidly increasing college income premium for young men seems to confirm several frequently cited economic trends. One is a massive economic restructuring of the economy that displaces all less educated workers into low paying jobs. A second is a deterioration in public education that makes a high school diploma less valuable than it used

---

4. Demand was especially strong for men from groups that were less affected by the limits of custom and occupational discrimination.

# Median Income of Men, 25-34 Years Old

(Median Income of Men with Any Income, by Education, 1967 to 1986)




Inflation-adjusted using PCE Index.

to be. But a review of earnings trends for all groups of workers - not just young men - suggests a more complex explanation.

We shall see that while the college premium for 25-34 year-old men grew rapidly, the college premium for 25-34 year old women grew more slowly and the college premiums for older men and women grew more slowly still. (Figure 2, for example, shows that among older men the ratio has not significantly changed in the past twenty years.) This suggests that such restructuring as has occurred to date has been heavily focused on young, less-educated men. Similarly, most of the deterioration in the position of younger, less educated men took place between 1980 and 1986. U.S. high school education has serious problems, but it is not likely that educational quality deteriorated so rapidly in so short a time.[5]

More generally, a full accounting of wage trends must examine the separate influences of at least three different forces.

- The first influence, restructuring, refers to shifts in the demand for different kinds of labor - e.g., the demand for middle-aged, college educated, men versus younger, high school educated men.

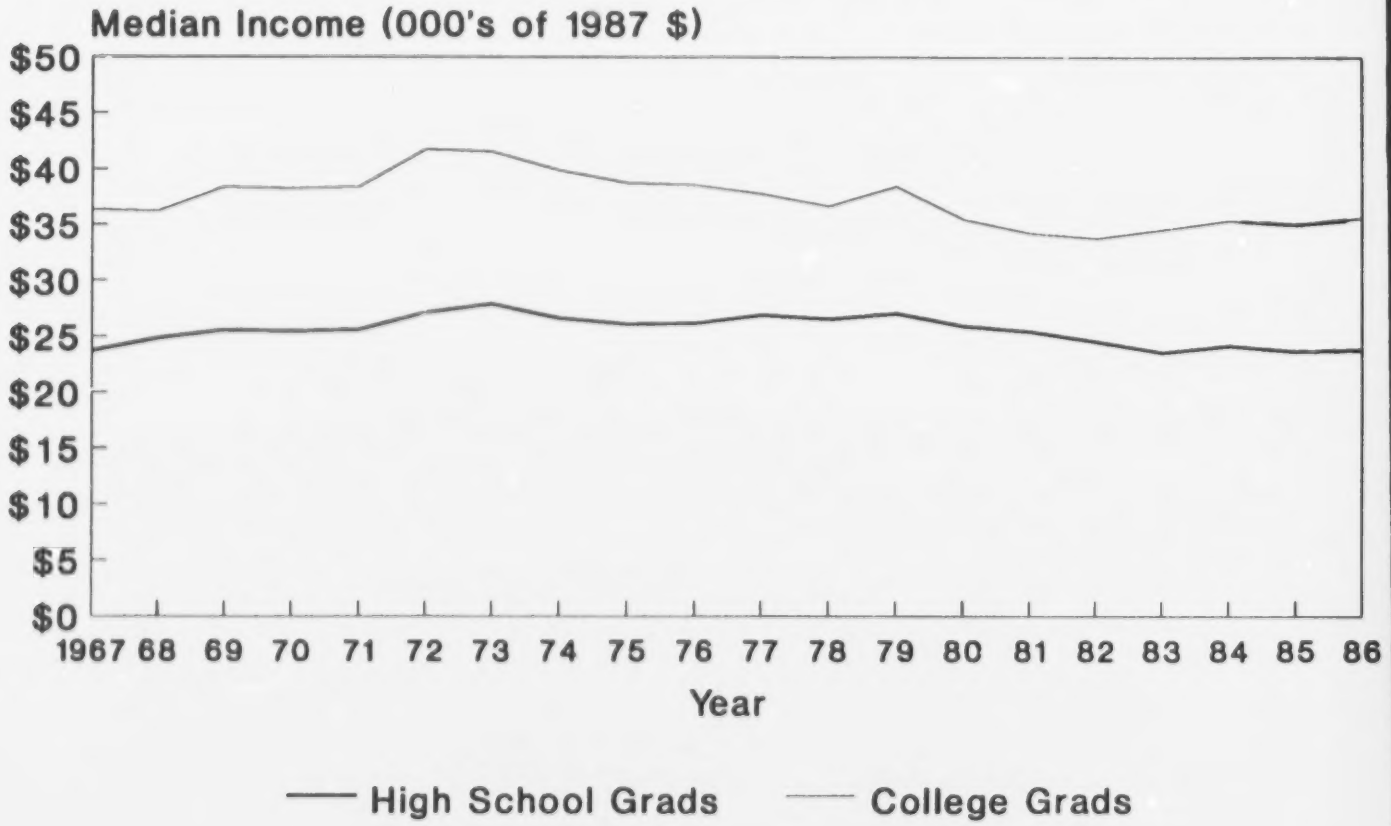
- The second influence, demographics and labor force participation, refers to shifts in the supply of different kinds of labor. Over the past 15 years, for example, the number of middle-aged working women with a college degree grew at a much faster rate than the number of younger men a with high school diploma. All other things being equal, groups that grow faster should experience slower wage growth (or more rapid wage decline).

---

5. Were this so, we would be saying that the male high school graduates of 1964-73 (who were 25-34 in 1980) had much better educations than the male high school graduates of 1970-79 (who were 25-34 in 1986), a conclusion that does not ring true. Similarly, if the growing college premium reflected the deteriorating quality of a high school education, we would expect it to affect both younger men and younger women, but as noted above, the college premium for younger women has grown much more modestly.

# Median Income of Men, 35-44 Years Old

(Median Income of Men with Any Income, by Education, 1967 to 1986)




Inflation-adjusted using PCE Index.

- The final influence is the set of macro-economic forces which determine the underlying trend in wage growth, including the rate of productivity growth, recessions, oil-price shocks, and so on.

Thus, macro-economic forces help to shape the underlying trend in wage growth, while restructuring (i.e. labor demand), demographics, and labor force participation (labor supply) determine how various groups of workers do vis-a-vis the trend. A review of these factors suggests the following points:

Restructuring (Changes in Labor Demand): A snapshot of the early 1970's shows less educated men to be concentrated in goods producing industries while better educated men and most women were concentrated in the service sector (Table 7). Between 1973 and 1987, the demand for service employment grew rapidly, while after 1979 the demand for manufacturing employment in particular was retarded by the 1980-82 recession, and then by the overvalued dollar of the mid-1980's which reduced export demand. Holding supply constant, these demand patterns worked in favor of women and against less educated men, particularly younger less educated men who lacked job seniority.

Demographics and Labor Force Participation (Changes in Labor Supply): Between 1973 and 1986, the number of college educated workers grew rapidly. The trend was most striking among middle aged men as the leading edge of the well educated baby-boom replaced earlier cohorts with less education. Over the period, the number of 35-44 year-old men with 4 years of college increased by 115% (compared to an 81% increase for 25-34 year old men with 4 years of college). A second major change in the labor force was the rapid increase in working women. Among workers of any age and educational level, the number of working women increased faster than the number of working men. Holding demand constant, these supply increases should have depressed earnings of women and more educated men (particularly in the 35-44 age range).

Oil Price Shocks and Low Productivity: Between 1973 and 1987, a combination of oil price shocks and low productivity growth led to a stagnant underlying wage level in the economy. In a context of stagnant wages, relative wage gains - a group doing better than the average - were also absolute wage

gains while relative wage losses - one group losing ground vis-a-vis others - became absolute losses as well.[6]

We find that earnings movements were dominated by the first and third factors - restructuring and oil price shocks and low productivity - while changes in labor supply (the second factor) played a more modest role. Generally speaking, well educated women now earn moderately more than their counterparts of the early 1970's, despite big increases in their numbers. Less educated women and well educated men earn about the same as their counterparts did in the early 1970's, again despite big increases in their numbers. But less educated men - particularly younger men who lacked job seniority - earn significantly less than their counterparts did in the early 1970's, despite the fact that their numbers increased relatively slowly. And for all of these groups, absolute earnings growth was far less than it would have been in a healthy economy.[7]

The plan of the paper is as follows. In Section II, we present detailed data on average earnings over the 1973-87 period and we discuss the earnings patterns that require explanation. In Section III, we discuss general problems of wage stagnation that have existed since 1973 and which provide a background for all wage movements.

In Section IV, we look at the supply side of the labor market and show that a model based on labor supply alone (in which the groups that increase most rapidly experience the

---

6. If the general wage level had been growing steadily during this period, a group with a relative wage loss could still have seen its wages improve in absolute terms.

7. For example, in an economy with sustained productivity growth of 2% per year, all workers could have experienced larger absolute earnings gains. We discuss this point in more detail in Section III.

slowest wage growth) can explain only a small part of observed earnings patterns. In Section V, we look at the demand side of the labor market and show how the changing demand for different kinds of labor - in particular, the slow growth of manufacturing employment - can provide at least part of a more consistent explanation of observed earnings trends.

In Section VI we put these pieces together to help clarify the debate over the meaning of "vanishing middle class jobs" as that term applies to adult men and women (ages 25-55). A middle class job has at least two meanings: a job that pays in the middle of the earnings distribution, and a job that pays enough to afford a middle class standard of living. By either standard, public debate over the question has been confusing because it has tried to draw conclusions from the combined earnings distribution for all workers - men and women, Ph.D.'s and high school drop-outs, all lumped together. Shifts in this distribution may reflect a shifting job structure but they may also reflect demography: more educated workers, more women, etc., as well as macroeconomic forces like slow productivity growth. By looking at the separate experience of different kinds of workers, we are better able to understand the economic changes of the 1973-87 period.

A final point to keep in mind is that most empirical economic work is sensitive to the time period studied. We have chosen 1973 as the first year of our study, not because it was a business cycle peak (which it was), but because we believe it marked a sea change in the American economy: a big energy price increase followed by a prolonged slowdown in the growth of labor productivity.[8] We have chosen 1987 as the end point of our study for a more

---

8. The productivity slowdown is discussed more fully in Section III.

prosaic reason; it was the latest detailed earnings data available when this paper was written. In terms of unemployment and other variables, 1988 is a slightly better year than 1987. If our analysis had covered 1973-1988 (rather than 1973-87) we might have reached slightly different conclusions but we would not expect the conclusions to change dramatically.

## II. REVIEWING THE DATA: WHAT IS TO BE EXPLAINED?

In recent years, a number of articles have examined data on annual earnings, often in the context of the economy's ability to generate middle class jobs.[9] Interpreting these data is not quite as easy as it seems. For any individual, annual earnings can be written:

1) Annual Earnings = Hourly Wage x Hours Worked per Year.[10]

If, for example, the typical working woman works longer hours today than she did ten years ago (which she does), her annual earnings will increase even if her job and hourly wage remains unchanged. And if the composition of the labor force changes over time - say, a greater proportion of college educated workers or a greater proportion of women - we would expect the distribution of earnings to change even if each specific group of workers holds the same job (with the same pay) that similar workers held fifteen years ago. It follows that to understand recent annual earnings trends, we must examine separately the earnings data for different groups of workers and we must examine both wage rate movements and changes in annual hours worked.

We begin this more detailed examination by looking at the annual earnings of year-round full-time workers. These are men and women who work at least 35 hours per week and 50 weeks per year (i.e. 1,750 hours per year), and so changes in their annual earnings are more

---

9. We return to the middle class jobs debate in Section VI. The footnotes in that section list the major papers in the debate.

10. We define an hourly wage as a person's annual earnings divided by their total hours worked. We find it useful in this paper to refer to an hourly wage even though the worker may actually be paid on a weekly, monthly or annual basis.

likely to reflect changing wages than changing hours of work (we return to this point shortly). Table 1 reports 1973, 1979 and 1987 mean earnings of men and women full-time workers between the ages of 25 and 54 - i.e. workers in their peak earnings years.[11] The data is subdivided by the age, education, and sex of the worker. The tabulated variable - mean earnings - includes the workers' wages and salaries, farm income, and income from self employment.[12] Mean, or average, earnings typically overstate the earnings of the "average worker" and so for each group of workers, mean earnings are supplemented by the proportion of the group who earn less than $20,000 (in 1987 dollars).[13]

Table 1's most prominant feature is the lack of earnings growth. In a healthy economy wages grow steadily so that, for example, the typical 40 year-old secretary who worked full time in 1987 should earn about 35% more (adjusted for inflation) than a 40 year-old secretary

---

11. To remind the reader, we use the implicit PCE deflator to adjust to 1987 dollars. See Appendix A for a discussion of this choice.

12. Earnings - the sum of wages and salaries, income from self-employment and farm income - is our subject of interest. In Section I and again in Section III, we present historical trends in terms of individual incomes (which also includes interest and dividends, unemployment compensation, etc.) because the Census did not publish earnings statistics per se in the 1950's or 1960's.

13. Within a group of workers, it is possible to find some persons with very high earnings but few if any workers have negative earnings. The result is the workers with very high earnings pull up the average so that more than half of the workers have earnings below the mean. The better statistic for representing the "average worker" is median earnings - the earnings level that separates the upper from the lower half of workers. The computation of medians (which requires repeated passes back and forth through the data rather than one set of addition and division) required too much computer time for inclusion in this paper.

Table 1

Changes in Mean Individual Earnings for Men and Women Who Work Full Time, By Age and Educational Level: 1973, 1979, and 1987
(1987 dollars)

| | Mean Earnings In: (Percent Earning $20,000 or Less) | | | Percent Change in Earnings Between: | | | Percent Change in Wages |
|---|---|---|---|---|---|---|---|
| | 1973 | 1979 | 1987 | 1973-1979 | 1979-1987 | 1973-1987 | 1973-1987* |
| **Men, 24-34** | | | | | | | |
| <4 yrs. H.S | $21,169 (50.3%) | $19,793 (57.9%) | $17,337 (70.7%) | -7% | -12% | -18% | -21% |
| 4 yrs. H.S. | $26,364 (27.0%) | $24,701 (36.0%) | $22,563 (48.6%) | -6% | -9% | -14% | -17% |
| 1-3 yrs. col. | $27,345 (25.2%) | $26,316 (30.6%) | $24,972 (40.0%) | -4% | -5% | -9% | -11% |
| 4 yrs. col. | $32,036 (14.7%) | $29,062 (23.6%) | $31,457 (22.4%) | -9% | +8% | -2% | -5% |
| >4 yrs. col. | $35,221 (11.1%) | $33,075 (17.7%) | $36,475 (17.4%) | -6% | +10% | +4% | +1% |
| **Men, 35-44** | | | | | | | |
| <4 yrs. H.S | $24,238 (40.3%) | $21,580 (51.9%) | $20,359 (56.7%) | -11% | -6% | -16% | -18% |
| 4 yrs. H.S. | $29,736 (19.0%) | $28,992 (24.5%) | $27,215 (31.9%) | -3% | -6% | -9% | -7% |
| 1-3 yrs. col. | $35,152 (12.1%) | $32,183 (16.9%) | $32,086 (21.9%) | -8% | --- | -9% | -10% |
| 4 yrs. col. | $43,331 (9.3%) | $40,555 (11.8%) | $39,439 (15.2%) | -6% | -3% | -9% | -11% |
| >4 yrs. col. | $49,367 (5.9%) | $44,483 (9.3%) | $46,443 (9.0%) | -10% | +4% | -6% | -4% |
| **Men, 45-54** | | | | | | | |
| <4 yrs. H.S | $24,506 (37.9%) | $23,907 (41.2%) | $23,701 (48.7%) | -2% | -1% | -3% | -7% |
| 4 yrs. H.S. | $30,621 (19.8%) | $29,773 (23.5%) | $29,174 (29.8%) | -3% | -2% | -5% | -5% |
| 1-3 yrs. col. | $36,858 (13.9%) | $33,608 (19.2%) | $36,509 (17.5%) | -9% | +9% | -1% | -3% |
| 4 yrs. col. | $45,757 (8.4%) | $43,565 (10.9%) | $44,898 (14.7%) | -5% | +3% | -2% | -2% |
| >4 yrs. col. | $49,557 (6.7%) | $46,157 (8.5%) | $49,581 (10.3%) | -7% | +7% | --- | -1% |

Table 1, contd.

| | Mean Earnings In: (Percent Earning $20,000 or Less) | | | Percent Change in Earnings Between: | | | Percent Change in Wages |
|---|---|---|---|---|---|---|---|
| | 1973 | 1979 | 1987 | 1973-1979 | 1979-1987 | 1973-1987 | 1973-1987* |
| **Women, 25-34** | | | | | | | |
| <4 yrs. H.S | $12,519 (92.8%) | $12,533 (91.4%) | $12,027 (93.3%) | --- | -4% | -4% | -16% |
| 4 yrs. H.S. | $15,157 (83.1%) | $15,516 (81.0%) | $15,756 (79.9%) | +2% | +2% | +4% | -8% |
| 1-3 yrs. col. | $17,971 (67.1%) | $17,783 (69.3%) | $18,673 (67.7%) | -1% | +5% | +4% | -6% |
| 4 yrs. col. | $20,733 (47.9%) | $20,116 (57.8%) | $23,228 (45.3%) | -3% | +16% | +12% | +5% |
| >4 yrs. col. | $24,787 (23.4%) | $23,624 (39.1%) | $27,045 (31.0%) | -5% | +15% | +9% | --- |
| **Women, 35-44** | | | | | | | |
| <4 yrs. H.S | $12,482 (90.9%) | $12,886 (90.5%) | $12,462 (91.7%) | +3% | -3% | --- | -13% |
| 4 yrs. H.S. | $16,006 (77.4%) | $15,963 (78.7%) | $17,128 (71.4%) | --- | +7% | +7% | +1% |
| 1-3 yrs. col. | $18,372 (65.5%) | $18,626 (67.8%) | $21,906 (51.7%) | +1% | +18% | +19% | +10% |
| 4 yrs. col. | $23,283 (41.1%) | $21,391 (51.4%) | $24,514 (39.4%) | -8% | +15% | +5% | +5% |
| >4 yrs. col. | $29,166 (16.5%) | $27,298 (24.6%) | $31,038 (19.6%) | -6% | +14% | +6% | +2% |
| **Women, 45-54** | | | | | | | |
| <4 yrs. H.S | $12,851 (88.8%) | $13,009 (89.0%) | $13,303 (85.1%) | +1% | +2% | +4% | -9% |
| 4 yrs. H.S. | $16,406 (77.3%) | $16,456 (76.6%) | $17,419 (70.9%) | --- | +6% | +6% | +3% |
| 1-3 yrs. col. | $18,769 (65.4%) | $18,683 (65.6%) | $20,787 (57.2%) | --- | +11% | +11% | +1% |
| 4 yrs. col. | $23,075 (39.3%) | $21,549 (51.4%) | $25,813 (38.4%) | -7% | +20% | +12% | +2% |
| >4 yrs. col. | $25,153 (31.0%) | $28,499 (23.0%) | $30,971 (20.6%) | +13% | +9% | +23% | +17% |

*Earnings adjusted for changes in hours worked.
Source: Authors' tabulations from CPS microdata files.

earned in 1973.[14] No group of workers in Table 1 shows this kind of earnings growth. Among women who worked year-round and full-time, average earnings typically increased by 5-10%. Among men who worked year-round and full-time, average earnings typically declined by 5-10%.

A more detailed look at the data shows that hourly wages per se grew more slowly over the period than full-time annual earnings. As noted above, a full-time worker is defined as someone who works 35 hours or more per week, a threshold which still permits some variation in annual hours worked over time. Women classified as year-round full-time workers worked an average of 36.8 hours per week in 1973 but they worked 41.8 hours per week in 1987. Similarly, men full-time workers worked an average of 43.1 hours per week in 1973 and 45.3 hours per week in 1987. The last column of Table 1 adjusts changes in full-time annual earnings for these changes in hours worked to get a more precise estimate of wage changes.[15]

The corrected wage estimates reenforce the lack of strong wage growth, along with three other patterns. The first pattern, noted above, is that women's wages, while lower than men's wages, grew more (or declined less) than men's wages over the period. Among year-round full-time workers, ages 25-34, with four years of college, women's hourly wages increased by 5% between 1973 and 1987 while men's hourly wages declined by 2%. A

---

14. This calculation assumes labor productivity and real wage growth of 2-2.5% per year over 12 years.

15. To make these corrections, separate changes in average hours worked were computed for each group of workers (i.e. workers of a given sex, age, and education).

similar pattern holds for year-round full-time workers of most other of other ages and educational levels: women's wages increased moderately while men's wages declined.[16]

The second pattern involves workers' educations. Among both men and women, the wages of less educated workers usually showed the slowest gains (or the biggest declines). For example, among 35-44 year old men who worked year-round and full-time, wages for those with 1-3 years of college declined by 11% while wages for those who had not completed high school declined by 18%. Similarly, among 25-34 year-old women who worked year-round and full-time, the wages of women with 4 years of college grew by 5% over the period while those who had only finished high school declined by 8%.[17]

A final pattern is that among all workers of the same sex, the wages of younger, less educated workers have grown less (or declined more) than the earnings of all other groups.

Table 1 looks only at year-round full-time workers. Table 2 expands the data to look at all prime age workers, men and women who worked at least 1 hour for pay during the year. Average earnings for these men and women reflect changes in their wages and changes in their annual hours worked.

In the case of men, we know that between 1973 and 1987, labor force participation trended downward, but among employed men the proportion who work year-round and full-time remained relatively stable. 1987 was the fourth year of recovery from the 1980-82

---

16. In a few cases, women's wages declined while men's wages declined more.

17. One comparison that does not fit this pattern involves middle aged men (ages 35-44) where the wages of men with 4 years of college declined by 11% while the wages of men with 4 years of high school declined by 7%. We return to this particular group of workers in Section IV.

Table 2

Mean Earnings of All Men and Women with $1 or More of Earnings, 1973 & 1987, and Decomposition of Changes in Earnings into Changes in Wages and Changes in Hours Worked
(1987 dollars)

| | Mean Earnings In: (Percent Earning $20,000 or Less) | | Percent Change in Earnings (AE%) | Percent Change in Wages (W%) | Percent Change in Annual Hrs. (AH%) |
|---|---|---|---|---|---|
| | 1973 | 1987 | | | |
| **Men, 25–34** | | | | | |
| <4 yrs. H.S. | $18,095 (60.9%) | $13,816 (79.4%) | -24% | -21% | -3% |
| 4 yrs. H.S. | $24,267 (35.7%) | $19,755 (58.0%) | -19% | -17% | -2% |
| 1-3 yrs. col. | $23,827 (38.9%) | $22,101 (49.7%) | -7% | -11% | +4% |
| 4 yrs. col. | $28,339 (27.7%) | $28,712 (31.6%) | +1% | -5% | +6% |
| >4 yrs. col. | $31,184 (25.4%) | $31,620 (31.1%) | +1% | +1% | --- |
| **Men, 35–44** | | | | | |
| <4 yrs. H.S. | $20,767 (52.5%) | $17,008 (67.5%) | -18% | -18% | --- |
| 4 yrs. H.S. | $27,946 (25.5%) | $24,623 (40.5%) | -12% | -7% | -5% |
| 1-3 yrs. col. | $33,215 (17.7%) | $29,132 (30.7%) | -12% | -10% | -2% |
| 4 yrs. col. | $41,926 (12.8%) | $36,870 (21.6%) | -12% | -11% | -1% |
| >4 yrs. col. | $47,712 (10.1%) | $44,267 (13.2%) | -7% | -4% | -3% |
| **Men, 45–54** | | | | | |
| <4 yrs. H.S. | $21,040 (50.6%) | $20,272 (58.4%) | -4% | -7% | +3% |
| 4 yrs. H.S. | $28,102 (28.6%) | $26,685 (37.6%) | -5% | -5% | --- |
| 1-3 yrs. col. | $33,656 (22.7%) | $33,809 (23.8%) | +1% | -3% | +4% |
| 4 yrs. col. | $42,988 (14.7%) | $42,393 (19.3%) | -1% | -2% | +1% |
| >4 yrs. col. | $48,049 (11.2%) | $47,911 (13.0%) | --- | -1% | +1% |

Table 2, contd.

| | Mean Earnings In: (Percent Earning $20,000 or Less) | | Percent Change in Earnings (AE%) | Percent Change in Wages (W%) | Percent Change in Annual Hrs. (AH%) |
|---|---|---|---|---|---|
| | 1973 | 1987 | | | |
| **Women, 25–34** | | | | | |
| <4 yrs. H.S. | $7,162 (98.4%) | $7,758 (97.1%) | +8% | -16% | +24% |
| 4 yrs. H.S. | $9,870 (94.9%) | $11,443 (88.0%) | +16% | -8% | +24% |
| 1-3 yrs. col. | $12,232 (88.2%) | $14,090 (79.1%) | +15% | -6% | +21% |
| 4 yrs. col. | $14,876 (78.1%) | $19,121 (59.2%) | +29% | +5% | +24% |
| >4 yrs. col. | $19,380 (55.4%) | $21,780 (49.8%) | +12% | --- | +12% |
| **Women, 35–44** | | | | | |
| <4 yrs. H.S. | $8,231 (97.7%) | $8,462 (95.5%) | +3% | -13% | +16% |
| 4 yrs. H.S. | $10,926 (92.2%) | $12,724 (82.1%) | +17% | +1% | +16% |
| 1-3 yrs. col. | $12,243 (88.1%) | $16,878 (67.1%) | +38% | +10% | +28% |
| 4 yrs. col. | $14,878 (80.1%) | $19,211 (56.9%) | +29% | +5% | +24% |
| >4 yrs. col. | $22,579 (52.4%) | $25,267 (38.6%) | +12% | +2% | +10% |
| **Women, 45–54** | | | | | |
| <4 yrs. H.S. | $8,834 (96.8%) | $9,337 (91.8%) | +6% | -9% | +15% |
| 4 yrs. H.S. | $12,223 (91.1%) | $13,286 (80.8%) | +9% | +3% | +6% |
| 1-3 yrs. col. | $14,209 (86.2%) | $16,107 (71.0%) | +13% | +1% | +12% |
| 4 yrs. col. | $18,835 (72.0%) | $19,669 (57.0%) | +4% | +2% | +2% |
| >4 yrs. col. | $22,035 (51.1%) | $26,319 (35.0%) | +19% | +17% | +2% |

Source: Authors' tabulations from CPS microdata files.

recession but the unemployment rate for men ages 20 and over still stood at 5.4% compared to 3.3% in 1973. However, 79% of men, ages 25-55, worked year round and full time in both 1973 and 1987.

In the case of women, between 1973 and 1987 average hours of work increased, and among working women of all ages, the proportion who work year-round and full time increased from .41 in 1973 to .59 in 1987.[18]

We can estimate the separate effects of wages and hours on earnings through a simple calculation. Begin with the average earnings of all 25-34 year old men with a high school education who worked in 1973. In that year, the mean earnings for the group was $24,267 (in 1987 dollars - see Table 2) and, as noted above (equation 1) we can think of this number as representing the product of two terms:

1) Annual Earnings = Wage per hour x Hours worked per year[19]

By 1987, the mean annual earnings of 25-34 year old working men with a high school education had declined to $19,755, a decline of 19%. Following (1) above, we can think of this decline as arising from a change in the wage rate (in this case a decline) and a change in hours worked (again, a decline) acting through the following formula:

2) $(1+AE\%) = (1+W\%) \times (1+AH\%)$

---

18. Figures taken from U.S. Bureau of the Census, Current Population Reports, "Money Incomes of Households, Families and Persons in the United States," Series P-60, nos. 97 (for 1973) and 159 (for 1986). Proportions refer to all working women--not just women between ages 25 and 55.

19. As noted earlier, a person's rate of pay per hour is a useful conceptual device even if the person views herself as being paid by the week or month or year.

where: AE% is the percent change in annual earnings (which in this case is negative)

W% is the percent change in hourly wages (which in this case is negative).

AH% is the percent change in annual hours worked (which in this case is negative).

We have already calculated a rough estimate of W% based on the experience of year-round full-time workers (the last column of Table 1). To calculate changes in hours worked, we substitute AE% (=-19%) and W% (=-17%) into (2) to solve for AH% which equals - 2%, i.e. a 2%, decline in hours worked per year.[20]

The data in Table 2 show that for most groups of workers, hourly wages and annual hours of work reenforced each other: when wages went up for a particular group (e.g. 35-44 year old women with 1-3 years of college), annual hours went up as well. When wages

---

20. The reader may ask why we do not simply calculate annual hours changes directly from the data. The problem lies in the reporting of the data. In any year, annual hours of work must be constructed by multiplying a person's number of weeks worked per year by the number of hours they normally work per week. In 1973, a individual's weeks of work was reported in intervals - e.g. 27 - 39 weeks - rather than as an actual number. For full-year workers (who worked 50-52 weeks per year), this was not a big problem. But for part-year workers, it made estimating annual hours of work quite difficult. The same consideration forced us to estimate wage changes based on year-round full-time workers only. Several other points: 1) Because we restrict our attention to working men and women, we fail to capture the fact that a slowly growing proportion of prime-age men report no earnings at all. 2) Our calculations compare similar workers at different points in time and they do not say what happened to a single set of individuals over time. 3) Our calculations assume that full-time and less-than-full time workers of a given age and education receive similar wages. If the wages of part year workers have actually declined relative to the wages of full year workers of the same age and education that effect will be lumped into the term AH%.

declined for a group (35-44 year old men with 4 years of high school) annual hours declined as well.

As a result, changes in average earnings for all workers in Table 2 typically replicate, with greater amplitude, the patterns for full time workers in Table l. Among workers of the same age and education, women's earnings grew faster than than men's. Among workers of the same age and sex, more educated workers' earnings usually grew faster than less educated workers' earnings. Among workers of the same sex, young less educated workers do worse than all other groups. One exception to these patterns occurs among 35-44 year-old men where the annual earnings of men with 12 years of high school, 1-3 years of college, and 4 years of college all declined by the same amount (-12%).

The gradual convergence of men's and women's earnings has been examined by a number of authors.[21] The simplest demonstration of the convergence is based on published median incomes of all women and all men who work year-round and full-time, a ratio which has grown from .57 in 1973 to .60 in 1979 to .66 in 1987. These median incomes parallel the data in Table 1. As shown in Table 1, a ratio based on the earnings (or incomes) of year-round full-time workers reflects more than converging wages because "year-round, full-time" women workers worked about five more hours per week in 1987 than they worked in 1973. But the data in Table 1 show wage convergence for men and women even adjusting for this fact. Moreover, they show that women's wages have been rising even as their hours of work

---

21. See James P. Smith and Michael P. Ward, Women's Wages and Work in the Twentieth Century, Santa Monica, Rand Corporation, 1984.

have increased while men's wages have been declining even as their hours of work have fallen.

The growing earnings gap between more and less educated workers has been less studied and is a reversal of past developments. As noted in Section 1, there was a time in the early 1970's when economists were beginning to question the usefulness of higher education as an economic investment. The data presented so far suggests the conclusion was premature, at least with respect to young workers. Table 3 contains one summary of this data, the changing relationship between education and hourly wage rates. In 1973, 25-34 year-old men with 4 years of high school earned about 18% less than similar men with 4 years of college. By 1987, this gap had opened to 28%. For 25-34 year old women, the corresponding high school-college earnings gap grew from 13% to 24% over the same period. For older men and women, however, the relationships between education and wages are more stable. This is consistent with the idea that as the labor market changes, any adjustment falls disproportionately on young, entry level workers.

In the three following sections, we propose an explanation of these labor market changes. The explanation begins by examining the macroeconomic context of the 1973-87 period which, we argue, involved a climate of generally stagnant earnings throughout the economy. This context helps explain the trend of slow wage growth which underlies Table 1. But as we have seen, some groups (e.g. college educated women) did better than this trend while others (younger, high school educated men) did worse and to explain these relative movements (vis-a-vis the trend) we turn to supply and demand. In Section IV, we examine changes in the supply of different kinds of labor as a possible explanation of variations around the trend. We

Table 3

Ratio of Wages of Workers with Specified Education to Wages of Workers with 4 Years of College, 1973 and 1987*

| | 1973 | 1987 |
|---|---|---|
| **Men, 25-34** | | |
| <4 years high school | .661 | .550 |
| 4 years high school | .823 | .719 |
| 1 - 3 years college | .854 | .800 |
| 4 years college | 1.0 | 1.0 |
| >4 years college | 1.099 | 1.169 |
| **Men, 35-44** | | |
| <4 years high school | .559 | .515 |
| 4 years high school | .686 | .717 |
| 1 - 3 years college | .811 | .820 |
| 4 years college | 1.0 | 1.0 |
| >4 years college | 1.139 | 1.229 |
| **Men, 45-54** | | |
| <4 years high school | .536 | .508 |
| 4 years high school | .669 | .649 |
| 1 - 3 years college | .806 | .797 |
| 4 years college | 1.0 | 1.0 |
| >4 years college | 1.083 | 1.094 |
| **Women, 25-34** | | |
| <4 years high school | .604 | .483 |
| 4 years high school | .731 | .641 |
| 1 - 3 years college | .867 | .776 |
| 4 years college | 1.0 | 1.0 |
| >4 years college | 1.196 | 1.139 |
| **Women, 35-44** | | |
| <4 years high school | .536 | .444 |
| 4 years high school | .687 | .661 |
| 1 - 3 years college | .789 | .827 |
| 4 years college | 1.0 | 1.0 |
| >4 years college | 1.253 | 1.217 |
| **Women, 45-54** | | |
| <4 years high school | .557 | .497 |
| 4 years high school | .711 | .718 |
| 1 - 3 years college | .813 | .805 |
| 4 years college | 1.0 | 1.0 |
| >4 years college | 1.090 | 1.250 |

*Wages estimated using the earnings of year-round, full-time workers.

find that changing supply was important for only a few groups of workers. In Section V, we examine changes in the demand for different kinds of labor and find that these demand changes are more consistent with the data. In Section VI we use our findings to illuminate the debate over the economy's ability to produce middle class jobs.

## III. SETTING THE CONTEXT: TWELVE YEARS OF STAGNANT WAGES

We noted at the end of Section I that observed wage trends can be thought of as the joint result of macroeconomic forces (which determine the general wage level) and the shifting supply and demand for different kinds of labor.

We begin by examining macroeconomic forces and the general climate of wage stagnation that existed from 1973 through at least 1987. The climate was important because, among other reasons, it meant that relative wage declines - one kind of labor falling further behind another - became absolute wage declines as well.

We sometimes picture a career as a process of pushing up a crowded flight of stairs, elbowing past competitors along the way.[22] This picture implies that the pay raises we get reflect merit alone. The truth is more complex. Our merit determines our advancement vis-a-vis other workers, but the purchasing power in any pay increase reflects both our merit and the economic health of the economy (and our employer). In a healthy economy, rising productivity - i.e. rising output per worker - creates a substantial amount of extra purchasing power for raises and so most workers can see their paychecks grow in absolute terms. The pushing and shoving is still there but it takes place on an up-escalator rather than a flight of stairs: some people move up faster than others but most people make progress as the whole wage scale rises.

---

22. If this description of a career seems strange, the reader should note that both authors grew up in New York State.

We can see this rising wage scale by following an income benchmark over time - for example, the median annual income of 45-54 year old men who worked year-round and full-time (Table 4). By 1987, the oldest baby-boomers (born in the late 1940's) had not yet turned 45 and so incomes of men in this age range were not yet affected by big changes in cohort size. By focusing on men who work year-round and full-time, we can isolate the effects of rising real wages while eliminating income fluctuations caused by unemployment.[23] The benchmark does have one problem. The best source for the benchmark is U.S. Census data and as noted above, the census measures only income while it excludes the value of fringe benefits. In recent years, these fringe benefits have become a rising portion of compensation and for this reason, Table 4 contains two columns: income as published by the Census and Census income figures with approximate adjustments for fringe benefits.[24]

During the 1950's and 1960's labor productivity was growing at 2.5-3.5% per year and the extra output provided the margin for higher wages. In 1946, for example, the average 50 year old man working full time had income of $15,257. (Table 4: all numbers are adjusted to 1987 dollars). This benchmark rose steadily so that by 1973, the year which ended with the first OPEC oil price increase, the average 50 year old man who worked full-time had income of $30,578.

---

23. Because we use published data to construct these historical trends, we have to use statistics on incomes rather than on earnings per se. See footnote 12.

24. These corrections are made by inflating Census estimates of median individual income by the ratio of Other Labor Income (which includes employer contributions for private fringe benefits) to Wage and Salary Income where both figures are taken from the National Income and Product Accounts.

Table 4

The Stagnation of Workers' Incomes After 1973

(1987 dollars)

| Men who were 50 in: | Their average income at age 50 (Full-Time Workers Only) | | Growth in the income scale over the previous decade | |
|---|---|---|---|---|
| | Census | Adjusted | Census | Adjusted |
| 1946* | $15,257 | $15,529 | - | - |
| 1956 | $18,558 | $19,208 | 21.6% | 23.7% |
| 1966 | $23,971 | $25,168 | 29.2% | 31.0% |
| (1973) | ($30,578 | $32,701) | ** | ** |
| 1977 | $30,356 | $32,752 | 23.9% | 27.1% |
| 1987 | $32,821 | $36,228 | 9.1% | 10.6% |

*1946 is used as a starting point because it is the first published data available.

**As noted in the text, the process of deep stagnation began at the end of 1973 with the first OPEC oil price shock. The growth rate of incomes between 1973 and 1987 on a per decade basis was 5.1% (Census) and 7.6% (Adjusted).

Source: Income statistics from U.S. Bureau of the Census, Current Population Reports, Series P-60, various issues. Income for adjustments from U.S. Department of Commerce, Bureau of Economic Analysis, National Income and Product Accounts, various issues. "Average Income of men at 50, Full Time Workers Only" refers to the median income of all male year-round, full-time workers, ages 45-54. Conversion to 1987 dollars made using the Personal Consumption Expenditure Index.

Relatively little of the earnings gain reflected men's movement out of "bad" jobs into "good" jobs. There was some change in men's occupational structure, particularly in the movement of labor out of low wage agriculture. But the gains reported in Table 4 reflected rising earnings in all industries. For example, in 1969, a skilled blue collar worker earned more, on average than a typical manager had earned in 1949. But after 1973, income growth slowed dramatically.

At the end of 1973, the four-fold increase in the price of oil led immediately to both recession and inflation and by 1975, the Census benchmark had fallen by about 3%.[25] More important, 1973 marked the beginning of the sharp slowdown in the growth of productivity.[26]

The income loss from the 1973-74 oil price shock followed by slow-growing productivity meant that the benchmark did not regain its 1973 level until 1979. Then the Iranian revolution followed by the Iran-Iraq War, triggered the second round of major OPEC oil price increases and the cycle began again. Between 1973 and 1986, the Census benchmark grew by only 5.2% per decade compared to 20-30% per decade in the 1950's and 1960's. Total compensation increased faster than wages and salaries as employers paid higher social security taxes and health insurance premiums. But when the benchmark is adjusted for these

---

25. Average earnings for all 50 year-old men (as distinct from full time workers) fell more sharply because unemployment rose sharply in the 1974-5 recession.

26. While the oil price increase coincided with the productivity slowdown, it was only one of several causes of that slowdown. For a good recent summary of what is known, see Martin N. Baily and Alok K. Chakrabarti, Innovation and the Productivity Crisis, Brookings Institution, 1988.

benefits, it grew by 7.7% per decade between 1973 and 1987, less than one-third of its earlier growth rate.

Wage stagnation exacerbated the problems associated with shifts in the supply and demand for different kinds of labor that are part of any economy. Had general wage levels continued to grow after 1973, the wages paid to 30 year-old high school graduates could have grown absolutely even as they fell further behind the wages of 30 year old college graduates. But since general wage levels were stagnant - since the escalator broke down - the relative declines in high school graduates' wages became absolute declines as well.

It is this wage stagnation that forms the context for the wage trends in Tables 1 and 2 and for the examination of relative wage movements that follows.

## IV. CHANGES IN LABOR SUPPLY

Oil price shocks and low productivity growth can explain the stagnant overall trend in earnings. But as we saw in Tables 1 and 2, some groups' earnings did better than the trend while other groups' earnings did worse. To explain these relative earnings movements (vis-a-vis the trend), we need to examine changes in the supply of, and demand for, different kinds of labor.

In this section, we look at the supply side of the labor market. We want to know to what extent observed patterns in annual earnings can be explained by the fact that some kinds of labor grew more rapidly (in percentage terms) than others between 1973 and 1987. Such growth can arise from any of three factors: changes in cohort size,[27] changes in the likelihood that a young person completes high school or goes to college,[28] and changes in labor force participation.

Our examination of the data is based on what we can call the "supply hypothesis." Suppose that changes in the relative earnings of different kinds of workers largely reflected changes in their relative numbers (i.e. labor supply) of those workers. If this were true, we would expect those groups of workers that grew most rapidly (in percentage terms) to experience the slowest earnings gains or the biggest earnings losses.

---

27. For example, the large size of baby-boom cohorts vis-a-vis earlier birth cohorts.

28. For example, a sharp increase in the likelihood of going to college would increase the number of college educated workers even if cohort size remained constant.

Table 5 compares changes in the supply of different kinds of workers to changes in their average earnings. Almost all of the data contradict the supply hypothesis. Specifically, the groups who numbers grew the fastest were usually the groups with the biggest average earnings gains.

Consider, for example, 35-44 year old men and women with four years of college. Within this group, the number of working women increased by 292% while working men increased by 141% but the women's earnings grew while the men's earnings declined. Similarly, among both young men and young women (25-34 years old), the number with college educations grew significantly faster than the number with 12 years of high school, but it was the high school educated workers whose earnings fared worse.

There is one exception to this pattern: the number of 35-44 year old men with college educations grew very rapidly and the group experienced significant earnings declines. For this group, the rapid increase in supply may have been a determinant of relative earnings movements. But the majority of the data suggest that most movements in relative earnings (vis-a-vis the general trend) were not driven by changes in supply of different kinds of labor. It follows that earnings movements must have been driven by changes in the demand for different kinds of labor. In Section V, we examine these changes in demand and their relationship to "good jobs" and "bad jobs".

Table 5

Changes in Group's Size and Group's Average Annual Earnings for 25-54 Year Old Men and Women Workers, 1973-1987

| | Number of Workers in: (millions) | | Percent Change in Group Size | Percent Change in Annual Earnings |
|---|---|---|---|---|
| | 1973 | 1987 | | |
| **Men, 25-34** | | | | |
| <4 yrs. H.S. | 2.66m | 2.71m | +1.9% | -24% |
| 4 yrs. H.S. | 5.28m | 7.99m | +51.3% | -19% |
| 1-3 yrs. col. | 2.59m | 3.95m | +52.5% | -7% |
| 4 yrs. col. | 1.79m | 3.32m | +85.5% | +1% |
| >4 yrs. col. | 1.47m | 1.74m | +18.4% | +1% |
| **Men, 35-44** | | | | |
| <4 yrs. H.S. | 3.25m | 1.96m | -40.0% | -18% |
| 4 yrs. H.S. | 3.91m | 5.42m | +38.6% | -12% |
| 1-3 yrs. col. | 1.38m | 3.29m | +138.4% | -12% |
| 4 yrs. col. | 1.11m | 2.67m | +140.5% | -12% |
| >4 yrs. col. | 1.07m | 2.50m | +133.6% | -7% |
| **Men, 45-54** | | | | |
| <4 yrs. H.S. | 4.73m | 2.29m | -51.6% | -4% |
| 4 yrs. H.S. | 4.29m | 4.28m | -0.2% | -5% |
| 1-3 yrs. col. | 1.42m | 1.78m | +25.4% | +1% |
| 4 yrs. col. | 1.05m | 1.41m | +34.3% | -1% |
| >4 yrs. col. | 0.88m | 1.65m | +87.5% | — |
| **Women, 25-34** | | | | |
| <4 yrs. H.S. | 1.32m | 1.40m | +6.1% | +8% |
| 4 yrs. H.S. | 3.51m | 7.05m | +100.9% | +16% |
| 1-3 yrs. col. | 1.33m | 3.99m | +200.0% | +15% |
| 4 yrs. col. | 1.06m | 2.92m | +175.5% | +29% |
| >4 yrs. col. | 0.52m | 1.33m | +155.8% | +12% |
| **Women, 35-44** | | | | |
| <4 yrs. H.S. | 1.58m | 1.46m | -7.6% | +3% |
| 4 yrs. H.S. | 2.80m | 5.75m | +105.4% | +17% |
| 1-3 yrs. col. | 0.74m | 3.11m | +320.2% | +38% |
| 4 yrs. col. | 0.48m | 1.88m | +291.7% | +29% |
| >4 yrs. col. | 0.30m | 1.59m | +430.0% | +12% |
| **Women, 45-54** | | | | |
| <4 yrs. H.S. | 2.14m | 1.60m | -25.2% | +6% |
| 4 yrs. H.S. | 2.98m | 4.38m | +47.0% | +9% |
| 1-3 yrs. col. | 0.70m | 1.67m | +138.6% | +13% |
| 4 yrs. col. | 0.37m | 1.03m | +178.4% | +4% |
| >4 yrs. col. | 0.28m | 0.82m | +192.9% | +19% |

Source: Authors' tabulations from CPS microdata files.

## V. CHANGES IN LABOR DEMAND

We turn next to the demand side of the labor market. Is it plausible that the relative earnings patterns in Tables 1 and 2 were driven not by changes in supply but changes in the demand for different kinds of labor? Put differently, we have argued that the loss of "good jobs" and their replacement by "bad jobs" cannot explain the generally slow growth of wages since 1973. But is it possible that a "good jobs-bad jobs" story helps to explain why some groups did better than this slow growth trend while other groups did worse?

Such a story would center on the way in which manufacturing employment grew slowly in the 1970's and, in particular, the early 1980's. The story would contain three elements:

- Less educated men (and, to a lesser extent, less educated women) were more concentrated in manufacturing and other goods producing industries than more educated men and women.
- Manufacturing and other goods producing jobs were, in fact, "good jobs" in the sense that they paid more than jobs in service sector industries.
- Between 1973 and 1987, growth in manufacturing employment was sufficiently slow to force many young, less educated workers - i.e. workers without job seniority - into service sector employment.

If this theory were correct, the wages of younger, less educated men[29] would suffer in two ways. First, even in an equilibrium situation, these men would earn less in service sector jobs than in manufacturing jobs and their average earnings would fall on this account. Second, the slow growth of manufacturing employment would not represent an equilibrium but rather

---

29. And, to a lesser extent, younger less educated women.

a situation where younger, less educated workers were in excess supply and this would put additional pressure on their wages and hours of employment in all sectors.

Implicit in the theory is the idea that better educated men and women of all educational levels were more concentrated in the service sector and so did not experience this kind of pressure. This theory does not explain all the patterns of Tables 1 and 2. It does not explain, for example, why the wages (and annual hours of work) increased for more educated women while they declined moderately for more educated men. That pattern may be due, at least in part, to a decline in employment discrimination against women. Similarly, the model does not explain why the earnings of 35-44 year-old college educated men declined more sharply than the earnings of college educated men who were both older and younger. As we noted earlier, that decline may simply reflect the very rapid increase in middle-aged men with college educations. Nonetheless, the theory, if correct, helps to explain the sharpest earnings movements in the table: the relatively weak earnings performance of younger, less educated workers.

To investigate this model, we begin by examining whether less educated men (and, to a lesser extent, less educated women) were concentrated in goods producing industries in the early 1970's. For simplicity, we divide employment into five broad industrial categories:

- Persons employed in Durable and Non-Durable Manufacturing.
- Persons employed in Other Goods Producing Industries, specifically mining and construction.
- Persons employed in Agriculture.
- Persons employed in the Service Sector including wholesale and retail trade, finance-insurance-and real estate, personal services, business and professional services,

transportation-utilities-communication, and public administration.

- o Persons who were not employed during the year.[30]

Table 6 shows the 1973 distribution of men and women across these employment categories. For completeness, the data include the proportion of men who report no work during the year. The data for women are restricted to those who work.[31] The data confirm that in 1973, less educated men were concentrated in durable manufacturing and other goods producing industries while more educated men and women were concentrated in services. For example, among men with a high school education or less, about 45% were employed in durable manufacturing or other goods industries while about 40% were employed in the service sector. Among men with at least some college, about 60% were employed in the service sector. Among women, the proportion employed in the service sector ran from 54% (for women who had not graduated high school) to 97% (for women with more than four years of college).

In interpreting Table 6 we recognize that individuals choose jobs - i.e. occupations - rather than industries, and the distribution of persons across industries reflects occupational choice. Thus the concentration of women in the service sector reflected their concentration in

---

30. Unavoidably, this category means something different for men and women. A priori, we expect men ages 25-55 to work and so changes in the "no work" category may reflect changes in unemployment and job availability. Among women, ages 25-55, a significant proportion stay out of the labor force voluntarily and so changes in the "no work" category are less easy to interpret.

31. Later in this section, we will compare industrial distributions for women in 1973, 1979 and 1987. Women's labor force participation increased sharply during this period and this makes it hard to separate industrial shifts from a higher proportion of women at work. For this reason, we confine women's industry data to working women.

Table 6

Distribution of Men and Women Across Industrial Sectors, 1973

| | Mfg. | Other Goods Industries | Service Sector | Agr. | Persons Who Did Not Work* |
|---|---|---|---|---|---|
| **All Men, 25-55, by education** | | | | | |
| L.T. H.S. | .32 | .16 | .35 | .07 | .10 |
| H.S. Grad. | .32 | .12 | .48 | .04 | .04 |
| 1-3 yrs. col. | .26 | .08 | .59 | .02 | .05 |
| 4 yrs. col. | .24 | .06 | .65 | .02 | .03 |
| 4+ yrs. col. | .14 | .02 | .80 | .01 | .03 |
| **Women, 25-55, by education** | | | | | |
| L.T. H.S. | .35 | .01 | .54 | .09 | n/a |
| H.S. Grad. | .20 | .02 | .76 | .02 | n/a |
| 1-3 yrs. col. | .12 | .01 | .86 | .01 | n/a |
| 4 yrs. col. | .06 | .02 | .91 | .01 | n/a |
| 4+ yrs. col. | .02 | .01 | .97 | .00 | n/a |

*Data for women exclude persons who did not work during the year. See text for explanation.

Source: Authors' Tabulations of the March 1974 Current Population Survey.

teaching (about 8%), sales (12%) and clerical work (31%), occupations which are heavily concentrated in service sector industries. Similarly, the concentration of less educated men in goods production reflected such occupations as crafts workers (28%) and operatives (25%) while the concentration of more educated men in services reflected such occupations as managers (30%) and the professions (45%).[32]

Next, we look at whether manufacturing and other goods producing jobs really were "good jobs" in 1973. Table 7 shows mean annual earnings for men and women workers, by level of education, in manufacturing and in the service sector. (Earnings data is restricted to these two large sectors to avoid small numbers of observations.)[33] The data for men include both year-round, full-time workers and part-time workers. To the extent that prime age men work less than full time, it is a partial reflection of both general unemployment and the conditions of the industry in which they work and so their part time work reflects the opportunities they face. Comparable data for women is harder to interpret since large numbers of women work less than full-time voluntarily. For this reason, women's data are restricted to year-round full-time workers.

Today, casual discussion associates "good jobs" with goods production and "bad jobs" with services. The data in Table 7 show that in 1973, at least, earnings patterns were less clear. A 30 year old man with a high school diploma could earn about as much in the service sector as he could in manufacturing. In the manufacturing sector, for example, the higher

---

32. These estimates are based on tabulations by the authors.

33. The data also exclude college educated women in manufacturing to avoid small numbers of observations.

wages of durable manufacturing were offset by the lower wages of non-durable manufacturing. In the service sector, the low earnings of retail sales and personal services were offset by the higher earnings of transportation, communications and utilities.

For these high school educated men, good jobs may have existed but the issue was more complicated than manufacturing versus services. Among 30 year-old college educated men (engineers, accountants) and high school educated women, manufacturing did provide an earnings premium over service sector jobs but at least for the women, the premium was not large (Table 7).[34]

In the fourteen years after 1973, vacancies in goods production did not grow appreciably. Goods producing industries - particularly durable manufacturing - are sensitive to economic downturns. The years after 1973 saw two sharp downturns: 1973-5 and 1980-82. In addition, the post 1982 recovery was accompanied by an extremely high value of the dollar which undercut demand for manufactured U.S. exports. As a result, manufacturing employment, in particular, was put under pressure.[35]

---

34. On the existence of inter-industry earnings differences, see Victor Fuchs, The Service Economy, New York, National Bureau of Economic Research and Columbia University Press, 1968, William T. Dickens and Lawrence F. Katz, "Interindustry Wage Differences and Theories of Wage Determination" National Bureau of Economic Research working paper, revised August 1986, and Lawrence F. Katz and Lawrence H. Summers, "Can Inter-Industry Wage Differentials Justify Strategic Trade Policy?, mimeo, National Bureau of Economic Research, April 1988, and the references cited therein.

35. On the relationship between goods producing industries and recessions, see Robert Z. Lawrence, Can America Compete?, Washington, D.C., The Brookings Institution, 1984. On the relationship between goods producing industries and the overvalued dollar, see Robert Z. Lawrence and Robert E. Litan, Saving Free Trade, Washington D.C., The Brookings Institution, 1986.

Table 7

Mean Earnings by Sector for Men and Women of Selected Education: 1973, 1986*

| Men (All Workers) | 1973 | 1987 | % change 1973-87 |
|---|---|---|---|
| 25-34 | | | |
| 4 years High School | | | |
| Manufacturing | 24,384 | 21,129 | -13% |
| Services | 24,983 | 19,010 | -24% |
| 4 years College | | | |
| Manufacturing | 34,829 | 32,185 | -8% |
| Services | 26,504 | 28,616 | +8% |
| 35-44 | | | |
| 4 years High School | | | |
| Manufacturing | 28,300 | 26,381 | -7% |
| Services | 29,471 | 25,339 | -14% |
| 4 years College | | | |
| Manufacturing | 48,020 | 42,493 | -12% |
| Services | 39,965 | 37,781 | -5% |
| 45-55 | | | |
| 4 years High School | | | |
| Manufacturing | 29,629 | 29,112 | -4% |
| Services | 28,244 | 26,971 | -5% |
| 4 years College | | | |
| Manufacturing | 51,231 | 46,893 | -9% |
| Services | 39,612 | 42,396 | +7% |

| Women (Year-Round Full-Time Workers Only) | 1973 | 1986* | % change 1973-87 |
|---|---|---|---|
| 25-34 | | | |
| 4 years High School | | | |
| Manufacturing | 15,684 | 16,475 | +5% |
| Services | 13,910 | 15,529 | +12% |
| 4 years College** | | | |
| Services | 20,658 | 23,019 | 11% |
| 35-44 | | | |
| 4 years High School | | | |
| Manufacturing | 17,424 | 19,387 | 11% |
| Services | 15,434 | 16,981 | 10% |
| 4 years College** | | | |
| Services | 23,223 | 26,128 | 12.5% |
| 45-55 | | | |
| 4 years High School** | | | |
| Services | 16,799 | 17,073 | +2% |
| 4 years College | | | |
| Services | 20,967 | 25,592 | +22% |

* 1987 data was not available at the time of this writing.
** Manufacturing for college educated women and for older high school educated women not reported due to too few observations.

The final part of the shifting demand model proposes that this slow growth caused large displacements from goods producing industries to the service sector. Did this happen among younger, less educated men? In general, the answer is yes. Table 8 compares the 1973 and 1987 industrial distributions of men and women. The data for 25-34 year-old men support the "good jobs - bad jobs" story with a twist. Among 25-34 year-olds with a high school education, the proportion in manufacturing fell sharply from .34 to .24. Among older high school educated men - men who had job seniority - job displacement was lower.

The experience of young high school men in manufacturing contrasts contrasts with the experience of young college men. Among 25-34 year old men with 4 years of college, the proportion of college educated men in manufacturing rose slightly from .21 to .23. The comparison is noteworthy because the absolute number of college educated men in this age group grew faster than the number of high school educated men (Table 5). This suggests that younger men were losing manufacturing jobs not only because of the slow growth of manufacturing employment but because the composition of that employment was shifting toward more educated workers.

As manufacturing opportunities diminished, young less educated men had to scramble to find employment. As shown in Table 8, part of the group went into the service sector while part dropped out of the labor market altogether. In this sense, the service sector acted as a "buffer" to soak up at least part of the employment that manufacturing could not accommodate. But the cost of the increased employment was lower wages.

Table 8

Distribution of Employed Men and Women Across Industrial Sectors, by Selected Age and Education, 1973, 1979, and 1987*

| | | Manufacturing | Mining & Construction | Service Sector | Agriculture | Did Not Work* |
|---|---|---|---|---|---|---|
| **Men, 25–34** | | | | | | |
| 4 yrs. H.S. | 1973 | .354 | .141 | .472 | .032 | .03 |
| | 1979 | .338 | .163 | .464 | .035 | .06 |
| | 1987 | .252 | .177 | .528 | .043 | .07 |
| 4 yrs. col. | 1973 | .211 | .058 | .710 | .022 | .04 |
| | 1979 | .209 | .076 | .686 | .029 | .04 |
| | 1987 | .225 | .057 | .695 | .023 | .02 |
| **Men, 35–44** | | | | | | |
| 4 yrs. H.S. | 1973 | .329 | .123 | .508 | .041 | .03 |
| | 1979 | .322 | .153 | .487 | .038 | .05 |
| | 1987 | .293 | .154 | .515 | .037 | .08 |
| 4 yrs. col. | 1973 | .285 | .044 | .644 | .027 | .01 |
| | 1979 | .238 | .059 | .683 | .020 | .03 |
| | 1987 | .223 | .064 | .699 | .014 | .02 |
| **Men, 45–54** | | | | | | |
| 4 yrs. H.S. | 1973 | .313 | .104 | .534 | .049 | .06 |
| | 1979 | .329 | .118 | .510 | .042 | .06 |
| | 1987 | .297 | .123 | .544 | .036 | .07 |
| 4 yrs. col. | 1973 | .269 | .080 | .632 | .019 | .04 |
| | 1979 | .292 | .052 | .641 | .015 | .03 |
| | 1987 | .280 | .056 | .647 | .017 | .03 |
| **Women, 25–34** | | | | | | |
| 4 yrs. H.S. | 1973 | .232 | .022 | .722 | .024 | |
| | 1979 | .207 | .018 | .762 | .013 | |
| | 1987 | .161 | .023 | .805 | .011 | |
| 4 yrs. col. | 1973 | .061 | .007 | .918 | .014 | |
| | 1979 | .086 | .010 | .898 | .006 | |
| | 1987 | .119 | .010 | .866 | .005 | |
| **Women, 35–44** | | | | | | |
| 4 yrs. H.S. | 1973 | .180 | .012 | .785 | .022 | |
| | 1979 | .182 | .024 | .775 | .019 | |
| | 1987 | .168 | .016 | .804 | .012 | |
| 4 yrs. col. | 1973 | .038 | .— | .954 | .008 | |
| | 1979 | .068 | .007 | .916 | .009 | |
| | 1987 | .061 | .018 | .912 | .010 | |
| **Women, 45–54** | | | | | | |
| 4 yrs. H.S. | 1973 | .193 | .013 | .763 | .031 | |
| | 1979 | .175 | .020 | .786 | .019 | |
| | 1987 | .159 | .020 | .800 | .021 | |
| 4 yrs. col. | 1973 | .037 | .009 | .946 | .008 | |
| | 1979 | .045 | .016 | .924 | .015 | |
| | 1987 | .056 | .013 | .916 | .015 | |

*The first four columns of each row refer to employed persons and sum to 1.0. The fifth column for men refers to the proportion of men of a given age and education who did not work that year.

Source: Authors' tabulations from CPS microdata files.

Between 1973 and 1986[36] the earnings of 25-34 year-old men with a high school education dropped by 13% in manufacturing but by 24% in services. Similarly, the earnings of 35-44 year-old men with a high school education dropped by 7% in manufacturing and 14% in services (Table 8). It follows that at least part of our current perception that service sector jobs are bad jobs (particularly for less educated men) reflects the service sector's recent role in absorbing excess labor.

The data in Table 8 for younger college educated men also underline a point made earlier. In Tables 1 and 2, we saw that average earnings for 25-34 year old college educated men did not grow between 1973 and 1987. In Table 8, we see that the proportions of these men in different industries did not change between the two years. This means that a general climate of stagnant wages does not necessarily imply a shift from manufacturing jobs to service sector jobs. Rather, it arises in this case from the oil price shocks and the slow growth of productivity described in Section III.

In summary, the brunt of the adjustment in manufacturing employment was taken out on younger less educated men (and to a lesser extent, less educated women). Older men and women - persons who had job seniority and whose marginal product to firms are generally higher - did not experience such sharp shifts in demand and this helps explain why their earnings performed relatively better over the period.

---

36. 1987 earnings data by industry was not yet available as this paper was being written.

## VI. SOLVING THE MIDDLE CLASS JOBS RIDDLE

Does the U.S. economy still produce middle class jobs? Over the past five years, that question has been the subject of substantial controversy (some of which occurred in the recent presidential campaign). Economists including Barry Bluestone and Bennett Harrison argue that the rapid growth of employment since the 1980-82 recession has been dominated by low wage jobs. Other economists including Marvin Kosters and Murray Ross argue that the proportion of high wage jobs has increased over the last 15 years.[37] In this section, we apply the results developed in this paper to put the controversy in perspective.

Men and women who are not labor economists must be surprised at how long the debate has continued. There is, of course, the question of how one defines a middle class job, a question to which we return below. But once a definition is agreed to,[38] counting the number of middle class jobs sounds like a straightforward operation. Nonetheless, the controversy continues for several reasons.

---

37. See Barry Bluestone and Bennett Harrison, "The Great American Job Machine: The Proliferation of Low Wage Employment in the U.S. Economy," a study prepared for the Joint Economic Committee, December, 1986, and Marvin H. Kosters and Murray N. Ross, "A Shrinking Middle Class?", The Public Interest, Number 90, Winter 1988, pp. 3-27. Also see: Robert J. Samuelson, "The American Job Machine," Newsweek, February 23, 1987; Warren T. Brookes, "Low-Pay Jobs: The Big Lie," The Wall Street Journal (op-ed), March 25, 1987; Janet Norwood, "The Job Machine Has Not Broken Down," The New York Times, February 22, 1987, Section F p.3; Council of Economic Advisors, The Economic Report of the President, 1988, Washington, GPO, February 1988, pp. 60-61. An earlier piece that is not part of this debate but bears on it is: Neal H. Rosenthal, "The Shrinking Middle Class: Myth or Reality?", Monthly Labor Review, March 1985, pp. 3-10.

38. In practice, differing definitions have not played a big role in the controversy.

The first reason involves the availability of data. Some job and wage surveys exist but surveys of individuals and their earnings are far more prevalent. For this reason, most analyses of the changing job structure have been based on the changing distribution of individual earnings, the kind of data we have analyzed in this paper.

Attempts to infer changes in the structure of jobs from changes in earnings must be done with great caution because other factors influence earnings as well. For example, we saw in Section III that bad macroeconomic events - oil price shocks, low productivity growth - can hold down earnings growth throughout the economy. This was the case in 1980 when inflation (as measured by the Personal Consumption Expenditure Index) rose by 9 percent but few people received "cost of living" increases that large. Thus, most people saw their real earnings decline even though their jobs hadn't changed. This means that any discussion of "middle class jobs" must distinguish between what is happening to jobs and what is happening to the wages they pay.

The controversy also continues because much of the debate is conducted at a highly aggregate level. The seminal paper of Bluestone and Harrison looks at changes in the earnings distribution of all people with earnings: men and women, teenagers and adults, Ph.D.'s and high school dropouts, all grouped together. As we saw in Tables 1 and 2, recent market changes did not affect all of these groups equally, and so the ability to secure a middle class job may be increasing for some kinds of workers while it declines for others. These movements will be quite apparent to the workers involved but they may be obscured when all workers are examined together.

A final reason for the continued controversy is the way in which the major studies in the debate classify jobs into "Low Wage," "Medium Wage," and "High Wage" jobs. As Kosters and Ross have shown, modest changes in the income cut-offs for the three categories can make large differences in one's conclusions.[39] In practice, it is more reasonable to present the data in dollar figures so that readers can observe trends for themselves.

Before turning to the data, we need to define a middle class job, and two definitions stand out. The first defines a middle class job as a job that pays enough to support a middle class standard of living. This, too, is an imprecise notion since a majority husband-wife families,[40] (most of whom see themselves as middle class) now rely on two paychecks for their family income. For purposes of this paper, we will arbitrarily say that a middle class job must pay at least $20,000 a year, measured in 1987 dollars. To put these figures in context, the average 35-44 year old man who worked year-round and full-time in 1987 had annual income of $31,500 while the average 35-44 year old woman who worked year-round and full time had annual income of $20,000.

A second definition of a middle class job is a job with earnings in the middle of the earnings distribution. By this definition, rising earnings for most workers can still mean fewer middle class jobs if earnings inequality is growing.[41] In this section, we will be concerned

---

39. See Kosters and Ross, op. cit.

40. Excluding the retired.

41. This would be the case if the earnings of low wage jobs were growing but the earnings of higher wage jobs were growing faster.

with changes in the number of middle class jobs by both definitions: changes in the level of earnings and changes in earnings inequality.[42]

Figure 3 compares the 1973 and 1987 earnings distributions for 25-55 year old men and women (combined) where the data are restricted to persons who worked at least one hour during the year. This type of earnings distribution forms the basis for much of the "middle class jobs" debate, but as noted above, we present the data in 1987 dollars rather than in "low", "medium" and "high" categories.

The data used in Figure 3 correct for a number of criticisms made of earlier studies.[43] Nonetheless, the resulting distribution of earnings for all workers supports a common interpretation of the Bluestone-Harrison work: Since 1973, the proportion of adult workers with earnings in the $20-$60,000 range has declined while the proportions with earnings lower than $20,000 and higher than $60,000 have both increased. Given our arbitrary

---

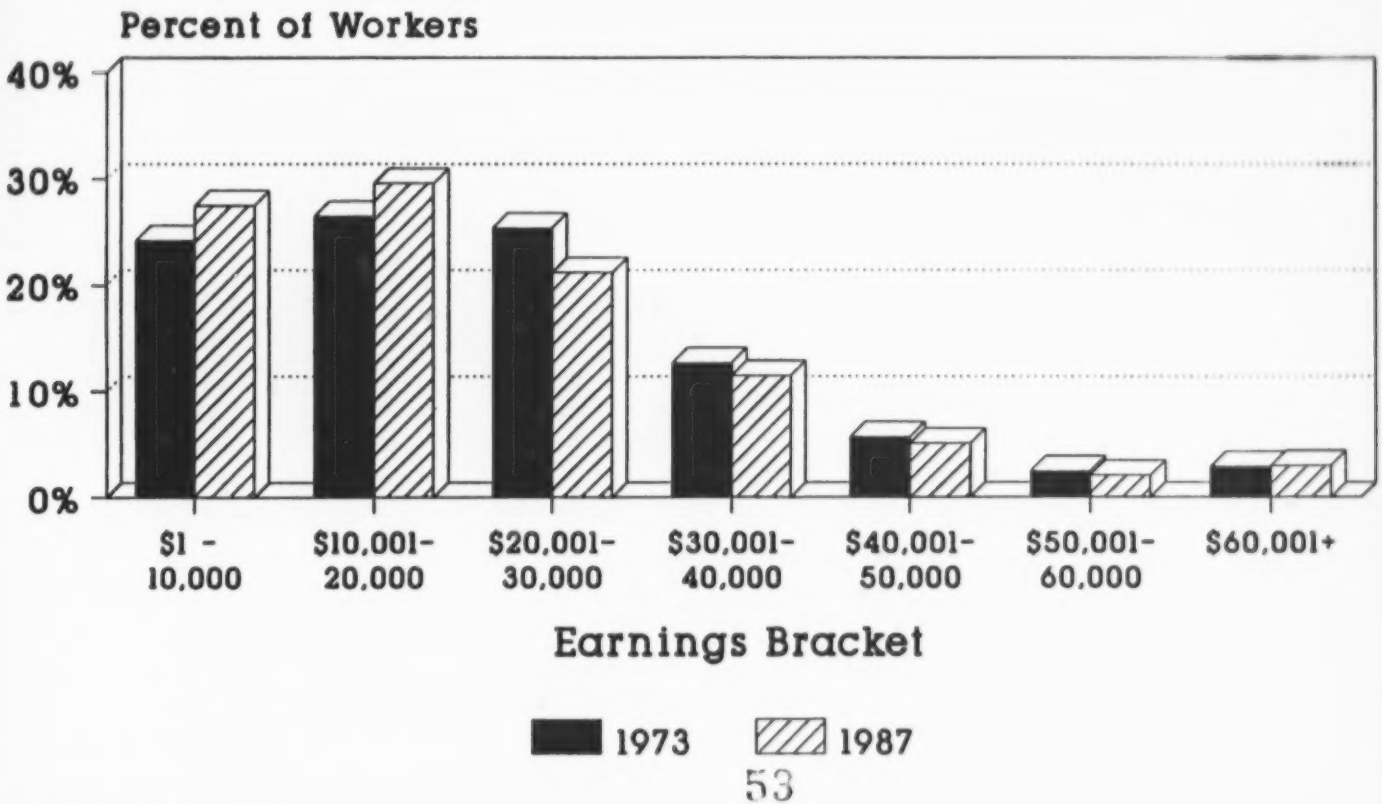
42. In many people's minds, a middle class job also involves "clean" work, work that does not require great physical strength and that a worker can still perform at age 55 or 60. In this paper, however, we shall stay with definitions based on earnings and incomes.

43. For example, the original Bluestone-Harrison paper focused on the earnings of all workers while Figures 2 and 3 examine prime age workers to exclude the potential impact of teenagers and the semi-retired on the earnings distribution. The Bluestone-Harrison paper compared earnings in 1973 (a very good year) to earnings in 1984 (a year of relatively high unemployment), while Figures 2 and 3 compare earnings in 1973 to earnings in 1987 (a good employment year). The Bluestone-Harrison paper converted earnings to constant dollars using the Consumer Price Index while Figures 2 and 3 use the implicit Personal Consumption Expenditure Index to avoid the possibility of overcorrecting for inflation. Finally, Figures 2 and 3 present data in real dollars rather than the "low-medium-high" classification used by Bluestone-Harrison and Kosters-Ross. See Kosters and Ross, op. cit. for a discussion of these points. See Appendix A of this paper for a discussion of alternate price indices to adjust for inflation.

FIGURE 3

# Earnings Distribution of Workers

## (1973 and 1987 distributions for men and women age 25-54 with any earnings)






Earnings in 1987 Dollars.
Inflation-Adjusted using PCE Index.

$20,000 floor for a middle class paycheck, Figure 3 is consistent with both definitions of fewer middle class jobs: a declining proportion of prime age workers earn less than $20,000, and the distribution of these worker's earnings shows greater inequality. This is the kind of data that lies at the heart of the "vanishing middle class jobs" debate.

It is clear that a part of this result is due to demography. We have seen that the number of working women is increasing faster than the number of working men (Table 5). This increase, combined with the fact that women's wages are lower than men's (Tables 1 and 2) will automatically produce an increasing number of workers with paychecks below $20,000.

To correct for this problem, Figures 4 and 5 separate the earnings distribution for men and women respectively. The distribution of men's wages (Figure 4) again is consistent with a popular interpretation of vanishing middle class jobs: a declining proportion of adult men in the $20 - $60,000 range with increasing proportions below $20,000 and above $50,000.

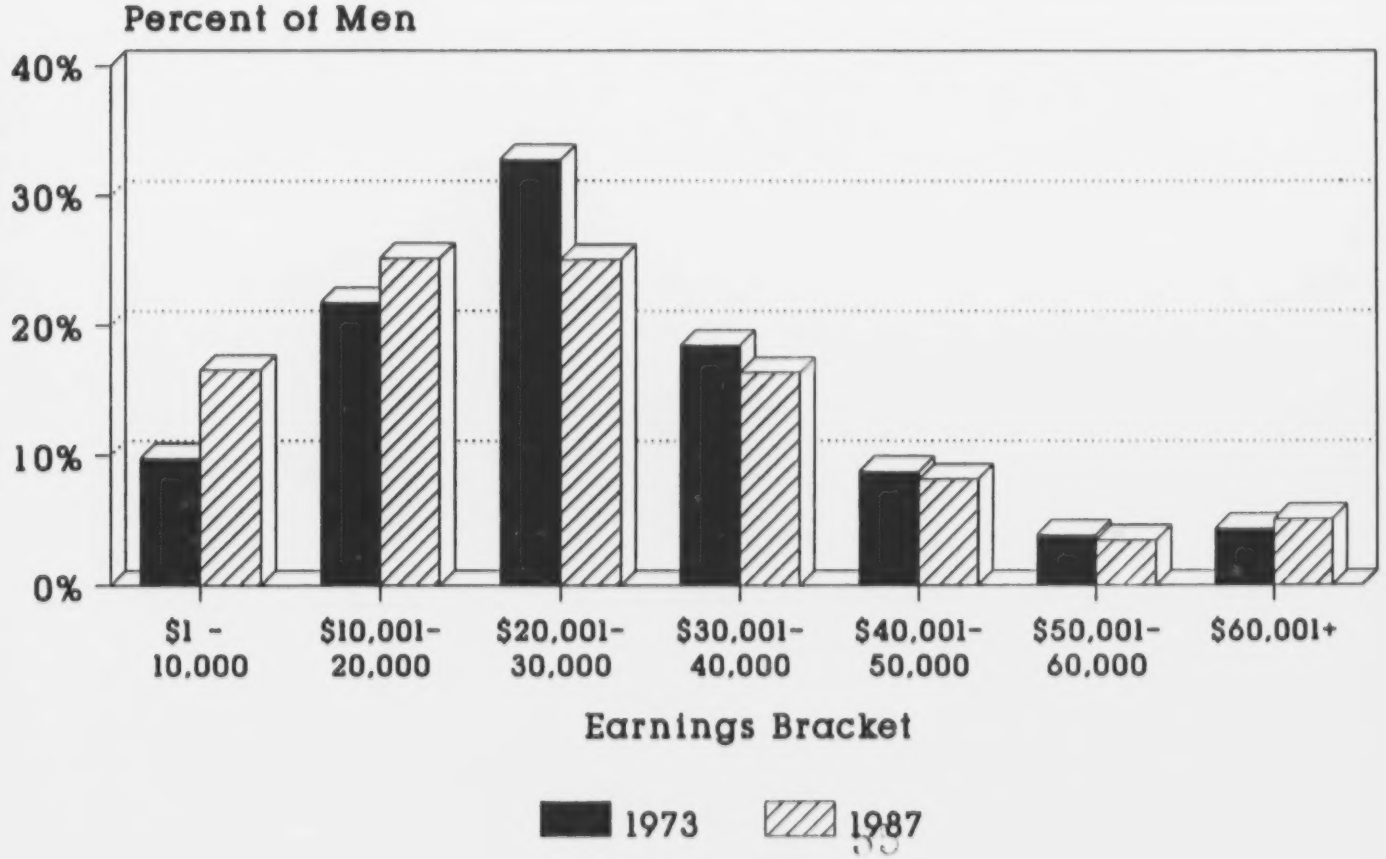
The distribution of women's earnings (Figure 4) is quite different. Between 1973 and 1987 the proportion of working women earning less than $10,000 declined while the proportion of working women who earned more than $20,000 increased. These data suggest that women had an increasing chance of earning a middle class income.

In sum, the earnings of all workers (Figure 3) and the earnings of men (Figure 4), both give a sense that the number of middle class pay checks is decreasing. The question is how much of the change is due to the changing structure of jobs and how much is due to other factors?

The results developed in the previous sections help to answer this question. The most important feature of Figures 3-5 is the least obvious; the fact that in each graph the 1973 and a

# Earnings Distribution of Men: 1973, 1987

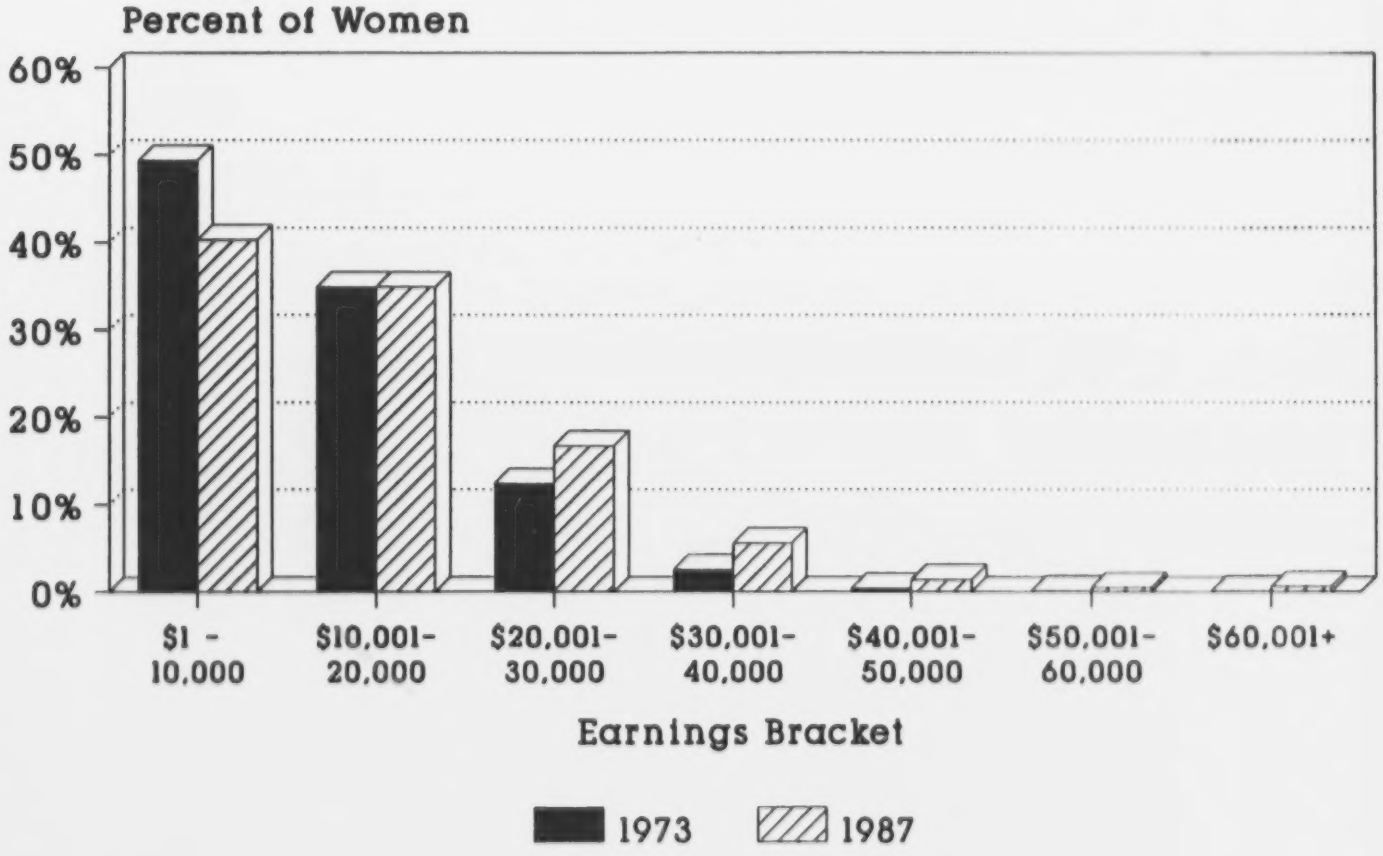
(Men, age 25-54, with any earnings)




Earnings in 1987 dollars.
Inflation-Adjusted using PCE Index.

# Earnings Distribution, Women: 1973, 1987

(Women age 25-54 with any earnings)




Earnings in 1987 Dollars.
Inflation-adjusted using PCE Index.

1987 earnings distributions substantially overlap with each other. This overlap reflects the economy's weak performance as outlined in Section III. For example, in the 14 years from 1959 to 1973, the median individual income of all men who worked year-round and full time increased from $19,296 to $27,490 (in 1987 dollars), a 43% increase.[44] If incomes had grown in a comparable fashion between 1973 and 1987, men who worked full time would have had average income of about $38,000 and the 1987 distribution in Figure 4 would have been concentrated in the $20 - $50,000 range.

At the same time, relatively little of this stagnation was due to a switch from good jobs to bad jobs. Recall, for example, the experience of younger college-educated men described in Section V. Between 1973 and 1987, their earnings stagnated even though the proportion of these men in manufacturing increased slightly. Their earnings, like the earnings of all workers were primarily influenced by macroeconomic events: oil price shocks and the productivity slowdown. The resulting stagnation, we argue below, is one important element of the middle class jobs debate.

By contrast, the growing proportion of men who earn less than $20,000 is more a story of good jobs and bad jobs. As manufacturing employment stopped growing, less educated men - particularly younger men without job seniority - were forced to look for jobs in the service sector. The resulting scramble depressed their wages sharply in the service sector and

---

44. Income figures are taken from U.S. Bureau of the Census, Current Population Reports, Series P-60, No. 159, Money Income of Households, Families and Persons in the United States, 1986, Table 14.

more moderately in manufacturing per se (Table 7). Service sector jobs became worse jobs than they had been in the early 1970's because they were absorbing an excess supply of labor.

The improving distribution of women's earnings (Figure 5) reflects both a moderate increase in women's wages (particularly for better educated women) and increased women's hours of work. Again, the shift among sectors has little to do with this trend since women were heavily concentrated in the service sector throughout the period.

What, then, are we to conclude about the economy's ability to produce middle class jobs? The answer comes in three parts. The first part of the answer involves the general stagnation of wages described in Section III (and in Tables 1 and 2). In Section III, we noted that in the years before 1973, rapidly rising wages had created a situation where a production worker, for example, could earn more (in real terms) than a manager had earned two decades earlier. But the converse of this situation also holds: When wages are stagnant, even "good" white collar jobs can pay too little to support a family in the style to which many Americans have become accustomed. This general wage stagnation forms the background for the middle class jobs debate and helps to explain why the audience for the debate has been so large.

The second part of the answer involves women's wages: in a climate of generally stagnant wages, women's wages grew moderately. For example, among 25-34 year-old women with 4 years of college who worked year-round and full-time, 52% earned more than $20,000 in 1973 while 55% earned more than $20,000 in 1987 (both figures are in 1987 dollars).[45] This growth is less than one would expect to see in an economy with strong

---

45. Though, as noted in Section II, some of this growth reflected increased hours of work among year-round full-time workers.

productivity growth. But given the slow growth of productivity and the rapid increase in the number of working women, these gains were noteworthy.[46] Annual earnings for all women grew at a substantially faster rate because the average working women worked longer hours (Table 2).

In sum, women earnings, like men's, suffered from the oil price shocks and low productivity growth that characterized the post-1973 period. But beyond this, it is hard to argue that the notion of vanishing middle class jobs applied to most women.[47]

The third part of the answer involves the wages and earnings of younger, less educated men. As we have seen, the slow growth of employment in goods production caused 25-34 year old men with a high school education or less (and to a more limited extent, young less educated women) to become in excess supply. This excess supply, coming on top of the generally stagnant wages meant significant declines in real earnings.

Earlier we arbitrarily defined a middle class job as one which paid at least $20,000 per year (in 1987 dollars). We also noted that the proportion of prime age men earning less than $20,000 had increased between 1973 and 1987 (Figure 4). The data developed in this paper suggest that most of this downward shift involved the declining earnings of less educated men - particularly younger ones.

---

46. Recall from Table 5 that men's wages declined even though the numbers of working men were increasing more slowly.

47. We note that the wages of younger, less educated women grew more slowly than the earnings of other groups but even these earnings were slightly higher in 1987 than 1973.

Consider all 25-55 year old men with 12 years of education or less who work at sometime during the year. In 1973, 64% of such men had earnings above $20,000 (in 1987 dollars). In 1987, 46% of such men had earnings above $20,000 (Figure 6). Similarly, consider the more specific case of 25-34 year-old men with exactly 12 years of education who worked at some point during the year. In 1973, 67% of such men earned more than $20,000. By 1987, 42% of such men earned more than $20,000.[48] The same movements have put these men outside the $20-$60,000 center or "middle class range" of the earnings distribution. In sum, when we compare current earnings statistics to earnings statistics of the early 1970's, the story of the vanishing middle class jobs is primarily a story about vanishing middle class jobs for men with high school educations or less.

It is tempting to argue that the deteriorating economic position of less educated men is a reflection of the nation's educational system, for example, an increased number of "social promotions" which devalue a high school degree. Two points argue against this. First, if the quality of recent high school graduates was rapidly declining, one would expect to find it reflected in the earnings of younger women as well as younger men. The wages of younger, less educated women did not grow sharply (Table l) but they did not show the sharp decline of young men's wages. Second, most of the deterioration in the wages of younger, less educated men took place between 1979 and 1987 and there is little reason to believe that educational quality can decline significantly in such a short time.[49] It is far more likely that the

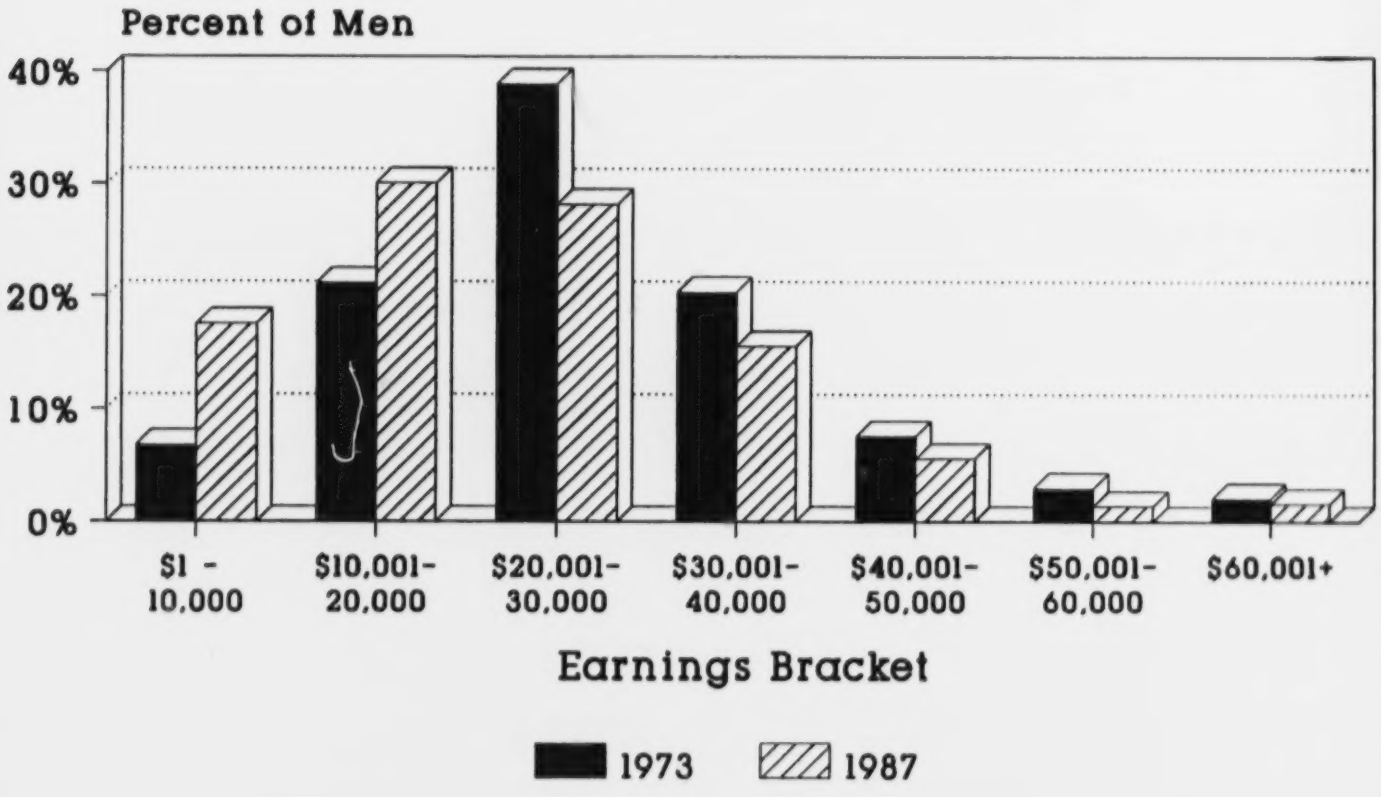
---

48. These differences would have been sharper if they included the increasing proportion of less educated men who report no earnings at all.

49. See footnote 5 for more detail on this point.

# Earnings of Male High School Graduates

(Men age 25-54 with 4 years high school, who had any earnings, 1973 and 1987)






Earnings in 1987 Dollars.
Inflation-Adjusted using PCE Index.

deteriorating wages among young, less educated men reflects the kinds of industrial demand shifts we have described.

This does not mean that the nation's educational system gets a clean bill of health. Without the problems of shifting demand, the wages of younger, less educated men (like the wages of most other groups) would have only grown slowly. Much of the slow growth in wages reflects the sustained low growth in productivity which does reflect, among other things, our ability to educate our workers. Unless we can discover how to boost productivity growth to something higher than current levels, the general wage level will continue to stagnate and the issue of the vanishing middle class jobs is sure to grow.

# APPENDIX A

## The Effects of Alternative Price Deflators on Real Income

In the recent debate over income trends in the period from 1973 to the present, one major issue which has arisen is how to compute real income, that is income after adjusting for the effects of prices. For many years prior to the early 1980's, this was not an issue at all. Almost all analysts, including those at the Bureau of the Census, used the Consumer Price Index (CPI) in various forms to deflate or inflate income figures from different years.

In the early 1980's, however, the Bureau of Labor Statistics in the U.S. Department of Labor made a major shift in the way in which it calculated the widely-used Consumer Price Index. This change was implemented in 1983 making the published CPI series discontinuous after 1982. The central debate which led to the recalculation arose after the period of rapid escalation in housing costs during the 1970's. The change involved the computation of housing costs. Prior to 1983, the CPI measured housing costs in way that overstated the costs faced by many families each year, basically by overadjusting for home appreciation and interest rate increases that did not affect many families. After 1983, the CPI used a rental equivalence concept which ostensibly represented more typical increases in the housing costs faced by most families by eliminating the "investment" component of housing costs.

Many analysts, including those at the Census Bureau, still use the published CPI series even though it is discontinuous. This is clearly wrong.

The Congressional Budget Office, in its February 1988 family income study, used a consistent CPI series, called the CPI-X1, which employed a rental equivalence concept of housing costs. In doing so, the CBO report argued the index better reflected cost changes. In this paper, we used the personal consumption expenditure component of the implicit Gross National Product deflator (referred to here as the PCE-I). There are a number of disadvantages to the PCE-I. For example, some of the price shifts can reflect changes in the mix of goods on which personal consumption expenditures are made and it includes only domestic goods as a measure of price increases. On the former grounds, analysts might prefer the fixed weight personal consumption expenditure deflator, which we will call the PCE-F and which fixes the mix of goods. On the latter grounds, the CPI-X1 might be preferred because it includes both domestic and foreign goods which are bought in the U.S.

One problem with the CPI-X1 is that it is most appropriate for families who already own their own homes or who intend to stay in the rental market. Thus, use of the CPI-X1 ignores an important cohort difference. The CPI-X1 may not be the appropriate price index for persons or families who were or are still in the market to buy their first home, principally those under forty years of age. Those persons experienced significant barriers to purchasing a home in the late 1970's and early 1980's in the form of housing price increases, interest rate increases and rising transactions costs imposed by new systems of financing home purchases.

Furthermore, a high proportion of families who did buy a home in the post-1977 period have adjustable, rather than fixed rate, mortgages. This effectively means that their annual housing expenditures are quite sensitive to interest rate fluctuations, an increase in

housing costs that could actually exceed that represented by the CPI-X1. As time goes on, if this generation of home buyers becomes a larger proportion of total families, the CPI-X1 may understate price increases for most families just as the old CPI overstated housing price increases for most families in the 1970s.

The truth is that the use of the CPI-X1 probably understates real income for precisely that group of persons which this paper argues has been most effected by shifts in labor income since 1973: young workers and principally young workers with lower educational attainment. It is hard to adjust for this methodologically without being inconsistent in the use of deflators by subgroup but it is important to note that no deflator is perfect and that caution should be exercised in advocating any single one as ideal for measuring real income gains and losses.

The bottom line question for this paper is what difference has the use of the PCE-I made in our results. The answer, as shown in Table A-1, is hardly any. (The table shows the calculations only through 1986 because a consistent CPI-X1 measure was not available to the authors for 1987.) The PCE-I increased by 130.4 percent between 1973 and 1986. The CPI-X1 increased by 130.3 percent over that same period. The PCE-F increased by a somewhat smaller 125.9 percent between 1973 and 1986 and the discontinuous CPI by 146.7 percent.

As this implies, using the PCE-I and the CPI-X1 to calculate real earnings or income changes between 1973 and 1986 results in a negligible difference. For example, real median family income shows a total change which rounds to 6.1 percent over that period whichever deflator is used. In contrast, use of the PCE-F for calculating real income results in an 8.2

Table A-1

Comparisons of Alternative Price Deflators

| Year | PCE-I | CPI-X1 | PCE-F | CPI |
|---|---|---|---|---|
| 1973 | 49.6 | 129.7 | 51.0 | 133.1 |
| 1983 | 104.1 | 271.5 | 104.2 | 298.4 |
| 1986 | 114.3 | 298.7 | 115.2 | 328.4 |
| Percentage Changes in the Indices: | | | | |
| 1973-86 | 130.4% | 130.3% | 125.9% | 146.7% |
| 1983-86 | 9.8% | 10.0% | 10.6% | 10.1% |
| Effects on Real Median Family Income (1986$): | | | | |
| 1973 | 27,766 | 27,753 | 27,223 | 29,730 |
| 1986 | 29,458 | 29,458 | 29,458 | 29,458 |
| Percent Change | + 6.1% | + 6.1% | + 8.2% | - .9% |

Sources: Implicit Personal Consumption Expenditure deflator (PCE-I), Fixed Weight Personal Consumption Expenditure deflator (PCE-F), and Consumer Price Index (CPI) from the February 1988 Economic Report of the President, Tables B-3, B-4 and B-58, respectively. CPI-X1 from February 1988 Congressional Budget Office report, Trends in Family Income: 1970-1986, Table B-2. Income data from U.S. Bureau of the Census, Money Income of Households, Families and Persons in the United States, various years.

percent increase in real median family income and use of the CPI results in a .9 percent decrease in the period from 1973 through 1986.

Since the year in which the BLS change was implemented, the published CPI has been continuous. Nevertheless, small differences still appear among the various deflators. Between 1983 and 1986, the published CPI increased by 10.1 percent, the CPI-X1 by 10.0 percent, the PCE-I by 9.8 percent and the PCE-F by 10.6 percent. Thus, for that particular short period, use of the PCE-F would have shown real income growth to be less than popularly believed, while use of the PCE-I would show income growth to be more.

It is important to note here, however, that although various deflators give different absolute results depending on the period being analyzed, one thing remains invariant. After 1973, wage and income growth were considerably slower in the United States than before.

# APPENDIX B

## Testing for the Significance of Earnings Differences

The source of our earnings data, the Current Population Survey, is based on a random sample of households. This means that the earnings estimates in Tables 1 and 2 are derived from sample data and changes in the wages of various groups - for example, the decline in the average earnings of 25-34 year old high school educated men who work year-round and full-time - may reflect random fluctuation rather than an actual phenomenon.

It is possible to construct a standard statistical test for the possibility that the difference between two means arises from random variation. Assuming the underlying variables are normally distributed, the test statistic can be written:

$$\frac{\text{Mean Earnings (1987) - Mean Earnings (1973)}}{(\text{s.e.1973})^2 + (\text{s.e.1986})}$$

where:

Mean Earnings (1973) refers to the mean 1973 earnings of a particular group, say 35-44 year old women with 4 years of high school who worked year-round and full-time as reported in Table 1.

s.e. 1973 refers to the standard error of estimate of Mean Earnings 1973, etc.

---

1. This calculation assumes no covariance between the two estimates, a reasonable assumption in this case since the two estimates come from non-overlapping samples.

While 1987 standard errors of estimate are not yet available the Census has published standard errors of estimate for 1986 mean earnings, by age and education.[2] We do not have comparable standard errors of estimate for 1973[3] but we will assume that the ratio of the standard error of estimate to the mean for a given group of workers was the same in 1973 as in 1986. Given this assumption, it is possible to calculate a "demonstration" test statistic (so called because of the assumptions needed to compute it).

These demonstration test statistics are displayed in Table B.1. Roughly speaking, a test statistic whose absolute value is greater than 1.96 reflects a change in a group's earnings that is significant at the 5% level. By this criteria, most groups have experienced statistically significant earnings changes. More precisely, these tests refer to the earnings of year-round full-time workers, and so most groups have experienced statistically significant wage changes.

In particular, the most noteworthy changes in the data - the sharp decline in the wages of younger, high school educated men and the increased wages of most groups of women - are all statistically significant at the 5% level using this approximation.

---

2. Current Population Reports, Series P-60, no. 159, Money Income of Households, Families and Persons in the United States: 1986, Table 36.

3. Computational difficulties precluded us from calculating such standard errors.

Table B-1

Demonstration Tests of Significance for Changes in the Average Earnings of Year-Round Full-Time Workers (i.e. wage differences) Between 1973-1986

(Earnings in 1987 dollars)

| | Mean Earnings In: | | Percent Change in Demonstration Test Statistics for Difference Between Means |
|---|---|---|---|
| | 1973 | 1986 | |
| **Men, 25-34** | | | |
| 4 yrs. H.S. | $26,364 | $22,226 | -12.51 |
| 4 yrs. col. | $32,036 | $31,745 | -.39 |
| **Men, 35-44** | | | |
| 4 yrs. H.S. | $28,876 | $27,738 | -2.53 |
| 4 yrs. col. | $43,331 | $40,194 | -2.78 |
| **Men, 45-54** | | | |
| 4 yrs. H.S. | $30,621 | $29,520 | -2.09 |
| 4 yrs. col. | $45,757 | $45,973 | +.11 |
| **Women, 25-34** | | | |
| 4 yrs. H.S. | $15,157 | $15,700 | +2.20 |
| 4 yrs. col. | $20,733 | $23,333 | +4.87 |
| **Women, 35-44** | | | |
| 4 yrs. H.S. | $16,006 | $17,373 | +4.17 |
| 4 yrs. col. | $23,283 | $26,214 | +3.15 |
| **Women, 45-54** | | | |
| 4 yrs. H.S. | $16,406 | $17,400 | +2.85 |
| 4 yrs. col. | $23,075 | $25,001 | +1.49 |

Source: Authors' calculations based on tabulations of March 1974 andd March 1987 Current Population Survey Public Use Tapes and standard errors of mean earnings as reported in Current Population Reports, Series P-60, no. 159, Money Income of Households, Families, and Persons in the United States: 1986, Table 36.